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Arthur D Little

Performance of Sampling Activities at MTL, Watertown, Massachusetts for EG&G Idaho, Inc.

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Final Report
Prepared for
U.S. Army Toxic and
Hazardous Materials Agency
and EG&G Idaho, Inc.

May 1990

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May, 1990

Prepared for

U.S. Army Toxic and Hazardous Materials Agency CETHA-BC/Bldg. E4435 Aberdeen Proving Ground, Maryland 20101-5401

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Abstract

Arthur D. Little, Inc., was retained by EG&G Idaho, Inc., under subcontract C87-131488 issued pursuant to Contract No. DE-AC07-761D01570 to conduct geotechnical services at the Material Technology Laboratory (MTL) in Watertown, Massachusetts. The objective of this "resampling" episode was to perform another round of sampling activities in support of the remedial investigation. This sampling is intended to duplicate, to the extent possible, the sampling performed in 1988.

The Army Materials Technology Laboratory (MTL) is located in Watertown, Massachusetts about six miles west of Boston. The facility currently occupies approximately 47 acres on the north bank of the Charles River and includes ten major structures used for research, development, testing and manufacturing.

The efforts involved in this investigation included:

- Collection of 18 groundwater samples at 16 existing monitoring wells. Two wells were sampled twice with the second sampling performed on a different day. Two field blanks were submitted with these samples. Trip blanks for volatiles were submitted with shipment of all volatile samples;
- Determination of water levels at 16 existing monitoring wells;
- Collection of 22 shallow surface soil samples taken by hand auger. This included two duplicate samples and two field blanks;
- · Collection of three sediment samples from storm sewer catch basins;
- Collection of seven 24 hour composite samples from storm sewer outfalls on the Charles River;
- · Collection of eight surface water and storage tank samples; and
- Collection of a sample of water from the reactor emergency coolant tank.

Samples were collected for volatile organics, base/neutral/acid extractables (semivolatile organics), pesticide/PCB's, metals, cyanide, and sulfide. The five samples collected adjacent to transformers were analyzed for PCBs only. Analyses necessary to chemically characterize samples in accordance with U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) certified methods were not completed under this contract but are provided under the USATHAMA Class contract with Arthur D. Little. Analytical data will be provided along with modeling, assessments, evaluations and conclusions in the Remedial Investigation (RI) Report.

The duration of the program was approximately nine weeks. Field activities commenced on February 5, 1990. All of the above tasks were successfully accomplished.

1.0 Introduction

Arthur D. Little, Inc., was retained by EG&G Idaho, Inc., under subcontract C87-131488 issued pursuant to Contract No. DE-AC07-761D01570 to conduct geotechnical services at the Material Technology Laboratory (MTL) in Watertown, Massachusetts. The objective of this "resampling" episode was to perform another round of sampling activities in support of the remedial investigation. This sampling is intended to duplicate, to the extent possible, the sampling performed in 1988.

Analyses necessary to chemically characterize samples in accordance with U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) certified methods were not completed under this contract but are provided under the USATHAMA Class contract with Arthur D. Little.

1.1 Scope of Work

The efforts involved in this investigation included:

- Collection of 18 groundwater samples at 16 existing monitoring wells. Two
 wells were sampled twice with the second sampling performed on a different
 day. Two field blanks were submitted with these samples. Trip blanks for
 volatiles were submitted with shipment of all volatile samples;
- Determination of water levels at 16 existing monitoring wells;
- Collection of 22 shallow surface soil samples taken by hand auger. This
 included two duplicate samples and two field blanks;
- Collection of three sediment samples from storm sewer catch basins;
- Collection of seven 24 hour composite samples from storm sewer outfalls o the Charles River.
- · Collection of eight surface water and storage tank samples; and
- Collection of a sample of water from the reactor emergency coolant tank.

All samples were collected in accordance with the USATHAMA QA Program, December 1986, 2nd Edition, March 1987, and Geotechnical Requirements for Drilling, Monitor Wells, Data Acquisition and Reports, March 1987. All samples were preserved as specified in that plan. Prior to transport all samples were screened for radioactivity. All samples were transported to the Arthur D. Little analytical laboratory and full chain of custody was maintained for all samples.

Samples were collected for volatile organics, base/neutral/acid extractables (semivolatile organics), pesticides/PCB's, metals, cyanide, and sulfide. The five samples collected adjacent to transformers were analyzed for PCBs only.

Chemical analysis necessary to develop data was conducted under a separate contract (under USATHAMA Class contract with Arthur D. Little) and thus will not be discussed in this final report. The list of compounds analyzed was specified by EG&G Idaho based on the previous sampling performed in 1988. Analytical data will be provided along with modeling, assessments, evaluations, and conclusions in the Remedial Investigation (RI) Report.

A review of options for disposal of purge waters was prepared. Purge water was contained in 55 gallon drums and stored on wooden pallets. Drums are labeled by the designation RI - MW - well number.

The duration of the program was approximately nine weeks. Field activities commenced on February 5, 1990. All of the above tasks were successfully accomplished.

Prior to commencing work at MTL, Arthur D. Little prepared a Health and Safety Plan, a Quality Control Plan, and a Sampling Plan. These plans, approved by EG&G Idaho and USATHAMA, detailed our procedures for site safety, operating procedures and quality objectives for site activities, locations of all samples and sampling procedures. During the program, quality objectives and performance were audited by Arthur D. Little's Quality Control Manager and during activity on site, safety procedures were monitored by Arthur D. Little's site Health and Safety Manager.

2.0 Site Location and History

2.1 Site Location

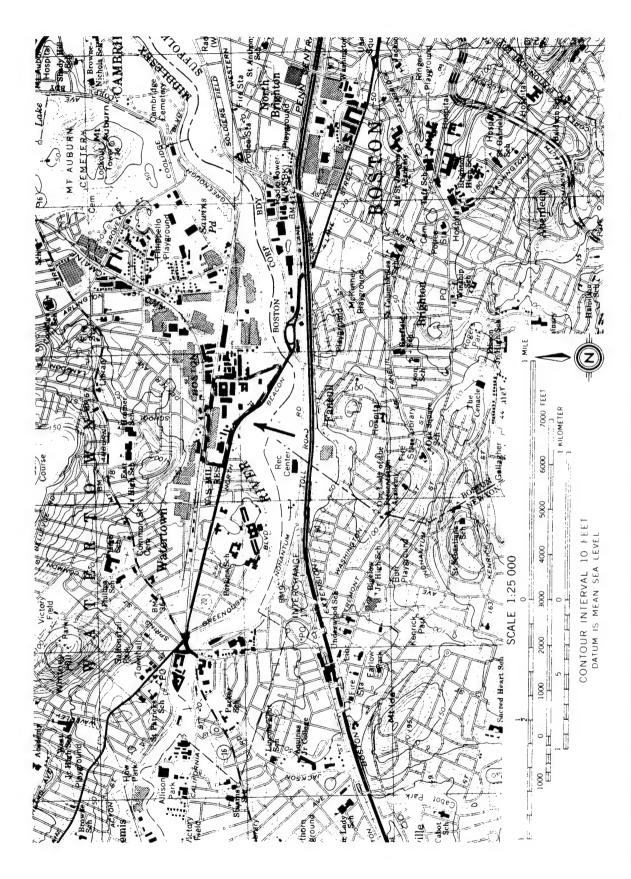
The Army Materials Technology Laboratory (MTL) is located in Watertown, Massachusetts about six miles west of Boston (see Figure 2.1). The facility currently occupies approximately 47 acres on the north bank of the Charles River and includes ten major structures used for research, development, testing and manufacturing.

2.2 Site History and Description

The MTL was originally established as the Watertown Arsenal in 1816 by order of President James Madison. The arsenal was initially used for the storage, cleaning, repair, and issue of small arms and ordinance supplies. Manufacturing was conducted on a limited scale until 1830. Activities were then expanded to include the manufacture of field, siege and seacoast guns, and gun carriages. During the Civil War, the arsenal was mobilized for the war effort and produced vast quantities of ammunition. In the 1880s the arsenal assumed responsibility for material testing and experimentation; special operations included mixing paint, preparing lubricants, waterproofing paper cartridges, and preparing ingredients for pyrotechnics such as post fires, fuzes, rock-fire, torches, fireballs, and signal rockets. In the final two decades of the 19th century, the arsenal was engaged in the manufacture of newly designed, field and siege, breech-loading steel guns and their carriages.

Activity at the arsenal increased dramatically during World War I. The facility was used for the production of ordinance supplies. More than 20 buildings were constructed during this period, and employment soared to more than 5,000. At its peak activity during World War II, the arsenal encompassed an area of approximately 131 acres, employed 10,000 people and maintained 53 buildings and structures. The number of employees dropped sharply after World War II. However, the arsenal continued to play an important role in arms development, and in 1953 it produced the famous 75-mm Skysweeper anti-aircraft gun. In 1960, the Army's first neutron radiography research nuclear reactor was dedicated at the facility. The reactor, used for researching the molecular and atomic structures of materials, was later deactivated in 1970.

A phase-down in operation was initiated in 1967. Much of the arsenal property was transferred to the General Services Administration (GSA). In 1968, approximately 55 acres of GSA property was sold to the Town of Watertown and was subsequently used for apartment buildings, the Arsenal Mall, and a public park and playground. Some 47.5 acres on the west end of the arsenal grounds was retained by the Army and later became the Army Materials and Mechanics Research Center (AMMRC), which in 1985 became MTL.



Location of Army Materials Technology Laboratory, Watertown, Massachusetts 2.1 Figure

While known as the AMMRC, the facility was designated a historical landmark by the American Society of Metals. Building 111 is virtually unaltered after 120 years of occupancy. It was placed on the National Register of Historic Places on January 30, 1976. In addition, a National Register nomination was prepared for the Gun Carriage Manufacturing Complex (Building 37, 43, 312, and 313).

Today, MTL employs approximately 600 people and occupies 15 buildings. It continues to function as the Army lead laboratory for materials, materials testing technology, lightweight armor, solid mechanics, and manufacturing testing technology.

3.0 Regional Geology

The following description of regional geology is taken from the 1988 Arthur D. Little report, "Geotechnical Report, Army Materials Technology Laboratory, Watertown, Massachusetts".

3.1 Bedrock Geology

The MTL facility is located within the north central portion of the Boston Basin, a topographic and structural basin bounded on the north and northwest by the North Boundary Thrust Fault, on the west by normal faulting and to the south by the Blue Hills and Ponkapoag Thrust Faults (Figure 3.1). To the southwest, intricate thrusting and tight, east plunging folds complicate the margin. The eastern margin of the basin is beneath Massachusetts Bay (Billings, 1976). Topographically the basin is bounded by low hills to the north, west, and south.

The basin is a structurally bounded depression in Precambrian basement filled with younger Mississippian and Pennsylvanian rocks (LaForge, 1932, Billings, 1976; and Kaye, 1980). At the southwest margin of the basin, the Precambrian basement outcrops in the cores of northeast plunging anticlines. To the south, between the Ponkapoag and Blue Hills Thrust Faults, the basin is intruded by the peralkaline Blue Hills Complex of Cambrian-Devonian age. The Blue Hills complex includes the Quincy Granite and other felsic intrusions. In the southwest portion of the basin, altered felsic and basaltic volcanics of the Mississippian Mattapan Complex are exposed. Volcanics of similar composition assigned to the Mississippian Lynn Complex are crosscut the Precambrian basement and are included as casts in the Pennsylvanian Boston Bay Group (LaForge, 1932).

The Boston Bay Group consists of two formations, the lower Roxbury Conglomerate and the upper Cambridge Argillite. LaForge (1932) subdivided the Roxbury Conglomerate into three members, the Squantum, Dorchester, and Brookline Members. In general, the Roxbury Conglomerate outcrops south of the Charles River over the southern portion of the basin, and the Cambridge Argillite outcrops north of the Charles River.

The Cambridge Argillite is typically a varved or rhythmically layered, indurated siltstone. Beds range in thickness from 0.1 to 8 cm, and vary from dark gray, clay to silt-rich layers, to light gray, very fine to fine-grained sand layers. Graded beds, cross beds, ripple marks, and slump structures are observed.

3.2 Structural Geology

The internal structure of the Boston Basin consists of a series of broad folds, plunging gently to the northeast or east (Billings, 1976). The MTL facility is located on the axis of the Charles River Syncline (Figure 3.1). Most of the fault

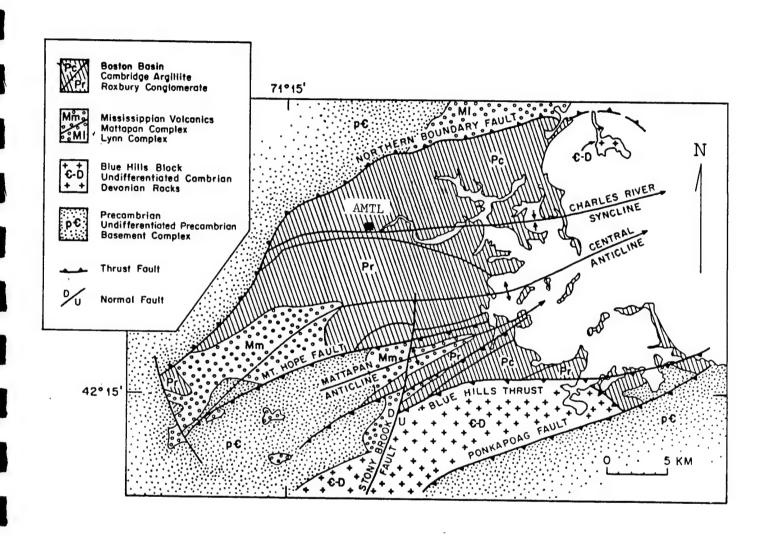


Figure 3.1 General geology of the Boston Basin (after Billings, 1976)

zones in the basin, including the bounding thrust faults, trend east-northeast. The only major exceptions to this area the Stony Brook Fault and an unnamed fault at the southwest margin of the basin, which are both normal faults and trend north-northeast and north-northwest, respectively. The Stony Brook Fault is mapped from Fresh Pond, approximately two miles east of the MTL, south-southwest for approximately 20 miles.

3.3 Quaternary Geology

Numerous glacial advances and retreats in the vicinity of the Boston Basin from 2 million years to 12,000 years ago have left a complex stratigraphic sequence of till, clay, and gravel. In general, the Quaternary aged deposits in the Boston Basin consist of (in ascending order) a basal till overlaying the bedrock, 0 to 70 feet thick, a marine clay, 0 to 60 feet thick, and outwash deposits of sand and gravel, 0 to 50 feet thick. General properties of the basal till and outwash deposits for the Boston area are summarized in Table 3.1.

General Properties of Basal Till and Outwash Deposits in the Boston Area (After Hatheway, 1982) Table 3.1

Characteristic	High Managed And and About 1	
Olial acteristic	Lougement (basal) IIII	Outwash
Particle Size Gradation	Well graded; very heterogeneous	Gap-graded/poorly sorted semihomogeneous
Presence of Boulders	Many, including erratics	Few to none
Percent (-) 200 Sieve	20-60	0-10
Percent (-) 0.02 mm	5-30	0-5
Effect of Fines	Governs engineering properties	Nii
Relative Density	Stiff - hard	Loose - moderately compact
Particle Shape	Angular-subangular	Subangular-rounded
Liquid Limit (%)	15-30	Non-plastic
Plasticity Index	0-20	Non-plastic
Standard Penetration (blows)	20-200+	0-20+
Cohesion (KN/m²)	0-25	approx. 0
Friction Angle (°)	15-33	25-45
Consolidation Ratio	Overconsolidated	Normal to underconsolidated
Permeability (in situ) (cm/sec)	10 ⁻⁵ to 10 ⁻⁹	10^{-2} to 10^{-5}

4.0 Site Geology

The following description of site geology is taken from the 1988 Arthur D. Little report, "Geotechnical Report, Army Materials Technology Laboratory, Watertown, Massachusetts", unless otherwise referenced.

4.1 Site Location

The Materials Technology Laboratory is located on the north bank of the Charles River in a generally flat area, decreasing in elevation (National Geodetic Vertical Datum, 1929) from approximately 36 feet at the north to approximately 2.4 feet (river elevation) at the south (Figure 4.1). Almost the entire MTL facility is situated on a low bluff, approximately 20 feet above the river elevation.

There are no known streams or natural drainages emptying to the Charles River in the vicinity of the MTL. All surface run-off is collected in the storm drain network and discharged to the river.

The locations of bore holes and monitoring wells placed at MTL during the 1988 geotechnical investigation by Arthur D. Little are shown in Figure 4.2. Two geologic cross sections, oriented approximately northwest-southeast are presented in Figure 4.3 and 4.4.

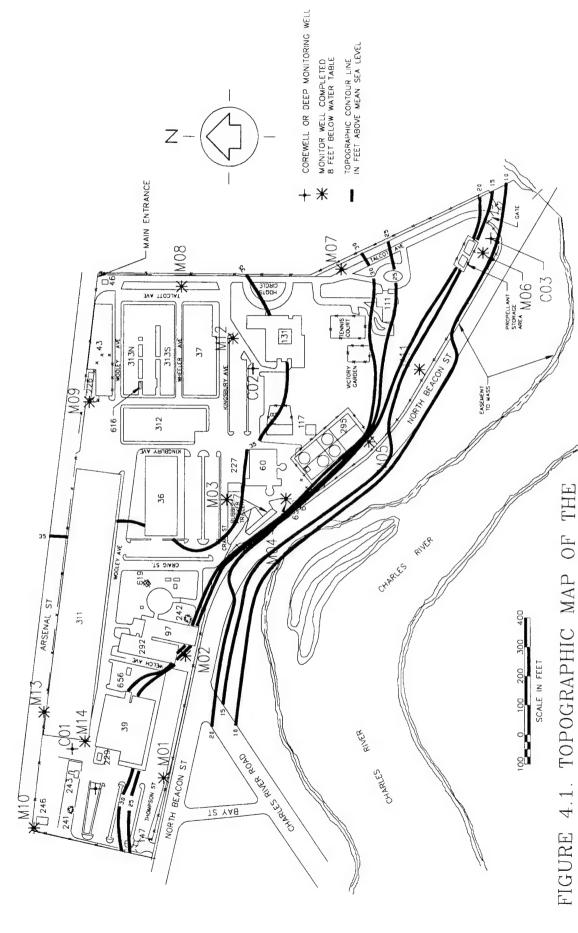
4.2 Bedrock Geology

The MTL facility is underlain by siltstone of the Pennsylvanian Cambridge Argillite. The siltstone was encountered at a depth of 61.5 feet in hole C01, at the northwest corner of the facility. At this location, the siltstone was very finely laminated with dark bluish gray silt to clay beds, and light bluish gray, very fine to fine-grained, sandy graded beds.

Observation of joints in a nearby outcrop, approximately 1 1/4 miles southwest of the facility, indicates three broad orientations:

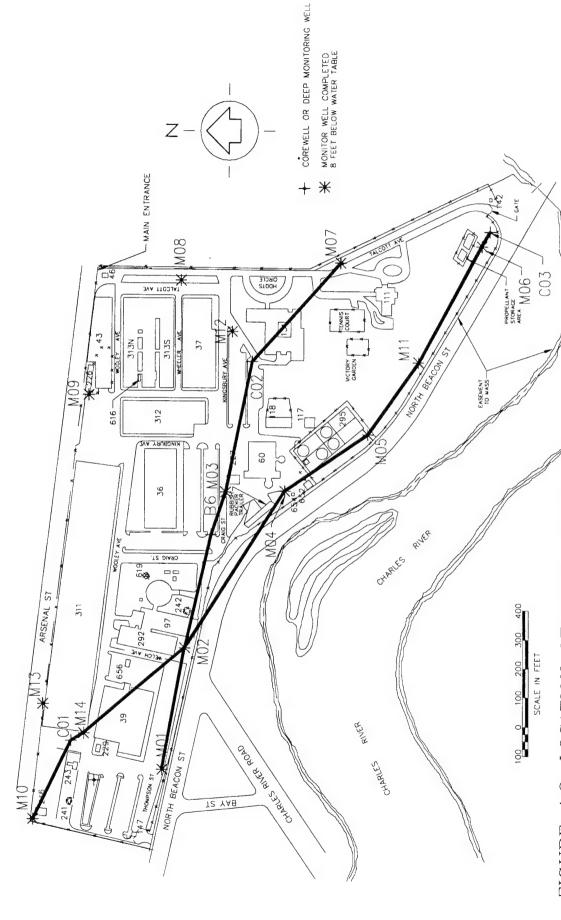
- Parallel to bedding, oriented approximately east-west, dipping about 20-30° south;
- A dominant set, oriented north-northeast, dipping nearly vertical; and
- Parallel to sheer zones, oriented east-northeast.

The north-northeast joint orientation is also that generally followed by felsic dikes in the Boston Basin (striking N15-45°E, dipping 60-90°) and the Stony Brook Fault.



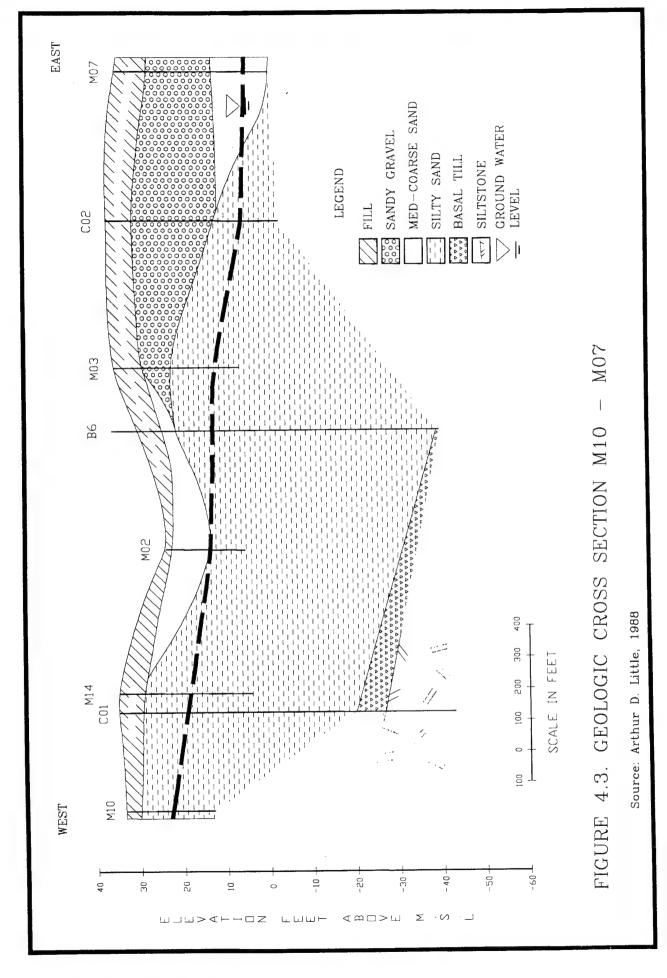
AMTL,

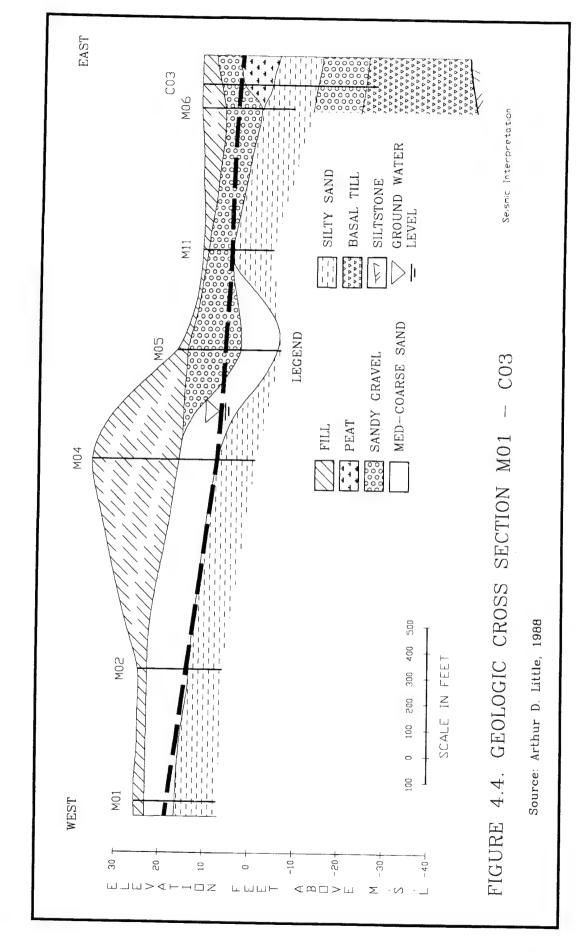
WATERTOWN, MASSACHUSETTS



Arder D Little

FIGURE 4.2. LOCATION OF DRILL HOLES AND GEOLOGIC CROSS SECTIONS Source: Arthur D. Little, 1988





4.3 Quaternary Geology

Estimates based on drilling (Figure 4.3 and 4.4) and a seismic refraction survey (Figures 4.5 and 4.6), suggest approximately 45 to 120 feet of Quaternary sediments have been deposited over the Cambridge Argillite bedrock at the MTL. While the precise stratigraphy varies from hole to hole, a generalized ascending sequence consists of a basal till of fairly cohesive, silt rich gravel; a moderate to well sorted, olive brown, silty, fine-grained sand; a medium to coarse-grained brown sand, locally grading to about 30% gravel; locally a sandy peat; and finally, fill material or disturbed sand and gravel.

Depth from surface to bedrock was estimated across the site using three seismic refraction profiles (Figure 4.5). The results of these three profiles, shown in Figure 4.6, indicate a generally gently undulating surface. The east-west profile shows a bedrock surface varying from 47 feet (below surface) at the northwest corner of the facility, falling off to about 110 feet and then rising to 90 feet at the northeast corner. The north-south profiles show a decrease in depth from 120 feet at the north to about 65 feet at the south. Based on the east-west seismic refraction profile bedrock at location C01 was predicted at 57 feet; the actual depth, based on drilling was 61.5 feet.

4.3.1 Basal Till

The basal till was encountered in only two holes on site, C01 and C03 and penetrated only in C01. In C01, the till was only six feet thick and consisted of round to subround cobbles of granite and felsic volcanics and subangular fragments of argillite. No split spoon samples were obtained in the till in C01 because of refusal, so the composition of the matrix is not known. In C03, the till consisted of a gray green, silt-rich gravel with angular decomposed rock fragments and medium to coarse-grained sand. While the exact thickness of the till is not known at C03, based on the depth of bedrock estimated from the seismic refraction profile, it would appear to be approximately 25 feet thick. In drilling previously completed to gather geotechnical data for foundation design, the till was encountered in a hole approximately 200 feet west of MW03 at a depth of 76 feet. The till was described as a dense brown, clayey to silty sand with gravel.

4.3.2 Silty Sand

The silty sand is found across the site and is usually comprised of a moderate to well sorted, very fine to fine-grained sand, with a silty-clayey matrix, commonly laminated. Its thickness ranges from approximately 10 feet in C03 to 50 feet in C01. It does not appear to be encountered in MW07 or MW08 and is thinnest in C03, so it may pinch out eastward. Since it was penetrated only in these two holes, it is not possible to make any conclusions regarding systemic variations in thickness. The silty sand probably represents a distal outwash deposit in a lacustrine environment.

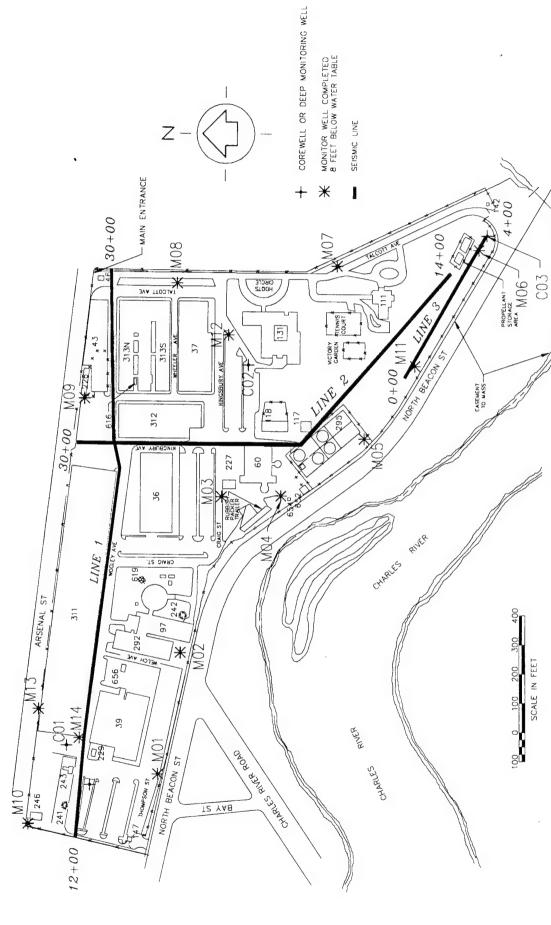
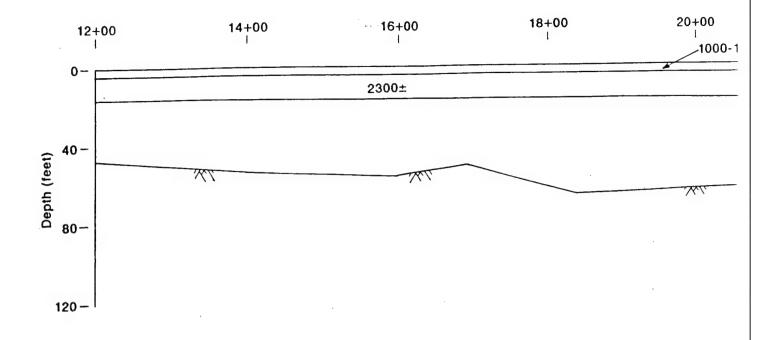
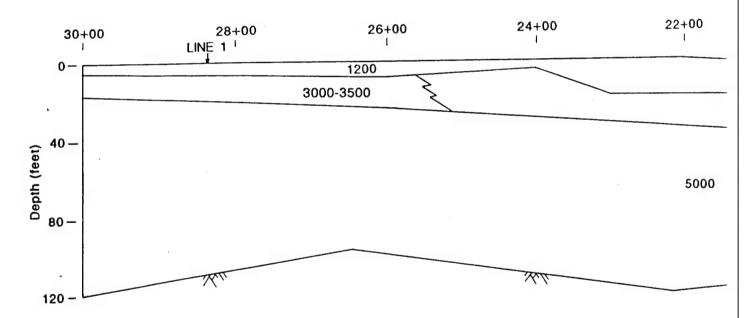


FIGURE 4.5. LOCATION OF SEISMIC REFRACTION PROFILES

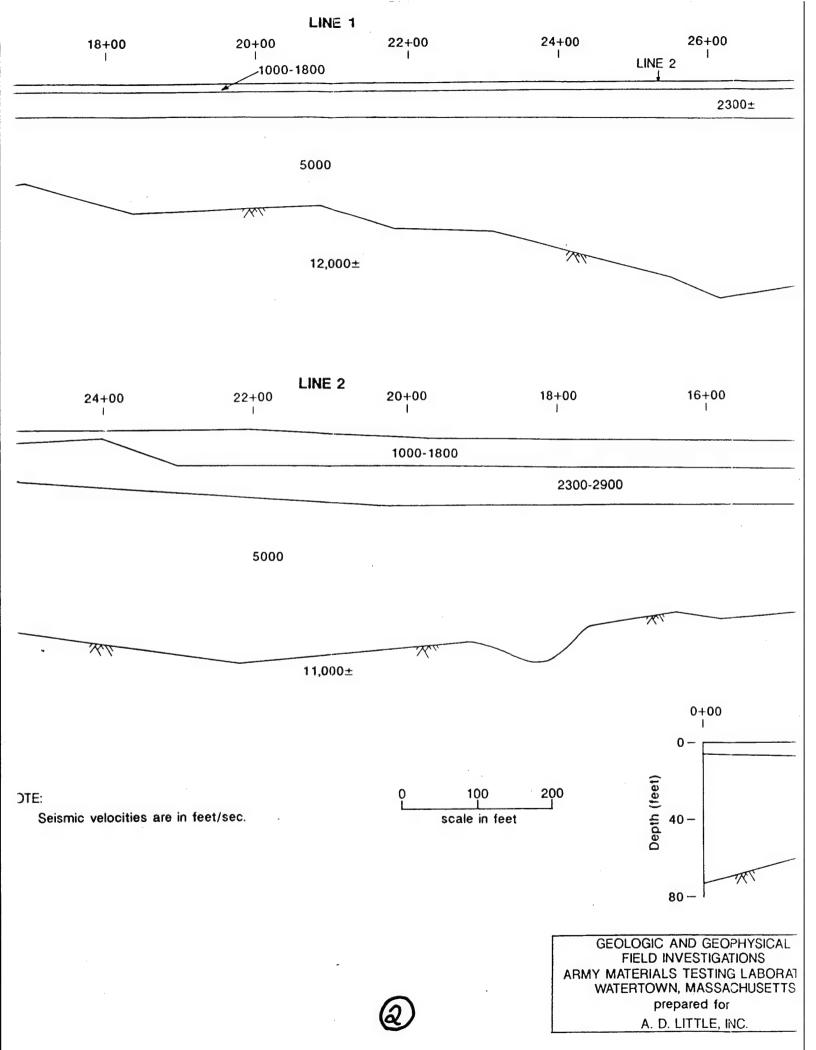
Source: Arthur D. Little, 1988

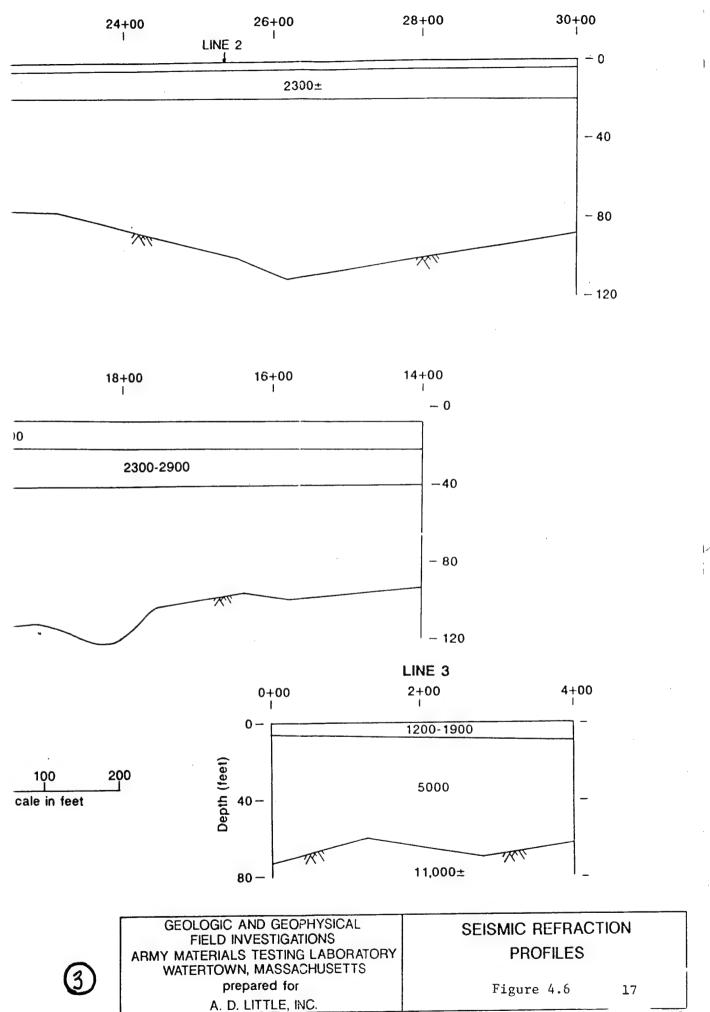




NOTE:

Seismic velocities are in feet/sec.





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4.3.3 Medium to Course Sand/Gravel

The medium to coarse-grained sand/gravel unit is highly variable in textural composition and is not found over the entire site. Where encountered, it lays above the silty sand and is overlain by fill and disturbed sands and gravels. It was not encountered in the northwest corner of the facility (Figure 4.3) and seems to grade from a medium to coarse-grain, well sorted, brown sand in the west portion of the facility to a yellowish brown, poorly sorted, gravel (30-40% pebbles and cobbles) with a poorly sorted, fine to coarse-grained sand matrix to the east. It ranges in thickness from absent to more than 35 feet, but averages approximately 10 feet. It is sometimes difficult to distinguish the gravel from disturbed or fill material, but in most cases the fill gravels were grayish brown and contained exotic debris such as brick, slag, concrete, and ceramics. The sand/gravel deposits probably represent fluvial (glacial meltwater) deposits.

4.3.4 Peat

In C03 at the southeast corner of the facility (Figure 4.4), a sequence of organic rich sand and sandy peat was encountered. This is the lowest portion of the MTL (11.9 feet), about 9 to 10 feet above normal Charles River elevation. The sandy peat probably represents a flood plain wetland deposit and consisted of grayish brown woody plant fragments and silty fine sand. When exposed to air, the peat gave off a sulfurous odor and immediately oxidized to a black brown color. Peat was not encountered in MW11 or MW06, the other low elevation hole locations.

4.3.5 Fill and Surficial Soils

Fill at the MTL facility is variable in distribution and thickness but is generally less than 20 feet. Usually the fill consists of poorly sorted sandy gravel, grayish brown in color. It commonly contains exotic debris such as brick, slag, concrete, and ceramics which can be used to distinguish it from the underlying fluvial gravels.

The surficial soil at the MTL is classified as Merrimac gravelly sand loam. It consists of 6 to 10 inches of dark brown gravelly sandy loam overlying 15 to 25 inches of yellow brown, friable gravelly sandy loam. The soil has been repeatedly disturbed during the history of the MTL by various construction activities.

4.4 Hydrology

The following description of hydrology at the MTL facility is taken from the 1988 Arthur D. Little report, Geotechnical report, Army Materials Technology Laboratory, Watertown, Massachusetts.

4.4.1 Surface Water

Surface water run-off and natural drainage at the MTL has been greatly influenced by modifications made to the natural land surface by construction of various structures and paved areas such as roads and parking lots. Watertown, in the

vicinity of the MTL, is heavily developed. The nearest pond, Swains Pond, is approximately 3,000 feet east of the MTL. The Charles River, one of the primary drainages in the Metropolitan Boston area, borders the site to the south. There are no known streams or other natural drainages to the Charles River in the vicinity of the MTL. Current surface drainage is dominantly to the storm sewer system which discharges into the river. Some natural run-off will follow topography toward the river. Natural recharge through seepage is probably quite minimal in the vicinity of the MTL because of the number of structures and paved areas.

4.4.2 Groundwater

Characterization of groundwater hydraulics at the MTL is based on 17 borings and 16 monitor wells installed at the site during May and June of 1988. Water level measurements were taken and in situ permeabilities measured by falling and rising head tests. Hydraulic parameters are summarized in Table 4.1.

Water level measurements taken at all wells and the Charles River on July 13, 1988 and February 8, 1990 (Table 4.2). Groundwater contours are estimated based on the 1988 data. These contours indicate flow is generally to the south, toward the River. In the northeast corner of the site, flow is to the southeast initially and then swings around to the south. Using the contours shown in Figure 4.7, gradients were estimated (Table 4.1). Figure 4.8 shows groundwater contours for the well measurements taken February 8, 1990.

Hydraulic conductivities (k) were calculated by the method of Hvorslev (Freeze and Cherry, 1979) using measurements of the maximum displacement of water and subsequent recoveries to equilibrium as a function of time (slug tests). The hydraulic conductivities calculated from the falling head and rising head tests are presented in Table 4.3 along with laboratory measurements of hydraulic conductivity. The results from monitor wells MW03, MW04, MW07 and MW14 are of questionable quality due to the erratic nature of the data; therefore, they are not used in our characterization of groundwater hydraulics.

The test results can be categorized based on the material in which the well was screened. Using data from monitor wells screened in silty sand (C02, C03, MW05, MW06, MW09, and MW11) an average value of k is 6.4×10^{-3} m/sec with a range from 7.06×10^{-4} to 1.30×10^{-2} cm/sec. For the medium to coarsegrained sandy gravel (MW01, MW02, MW08, MW12, and MW13) an average value of k is 2.7×10^{-2} cm/sec with a range from 4.24×10^{-3} to 3.30×10^{-2} cm/sec. These values are within expected ranges of values for silty sand (10^{-5} to 10^{-1} cm/sec) and sand (10^{-3} to 1 cm/sec) (Freeze and Cherry, 1979).

Hydraulic conductivity of the bedrock, the Cambridge Argillite (actually a siltstone), was determined by pressure testing of a packed bedrock interval (68-78 feet). Values of k ranged from 1.72×10^{-7} to 8.88×10^{-7} cm/sec and averaged 4.1 x 10^{-7} cm/sec. A value of 10^{-7} cm/sec is at the high end of the range for shale

Table 4.1 Hydraulic Parameters

1. Gradient (i)

- a. West portion: 0.025 to south.
- b. East central portion: 0.030 to southeast, swings to 0.005 to south.

2. Hydraulic Conductivity (k)

- a. Silty sand: 6.4×10^{-3} cm/sec (average) $7.06 \times 10^{-4} - 1.30 \times 10^{-2}$ cm/sec (range)
- b. Medium-coarse sandy gravel: 2.7 x 10⁻² cm/sec (average) 4.24 x 10⁻³ - 3.30 x 10⁻² cm/sec (range)
- c. Siltstone:
 4.1 x 10⁻⁷ cm/sec (average)
 1.72 x 10⁻⁷ 8.88 x 10⁻⁷ cm/sec (range)

3. Flow Rate (Q)

a. 0.016 m³/sec (98 gpm).

4. Flow Velocity (v)

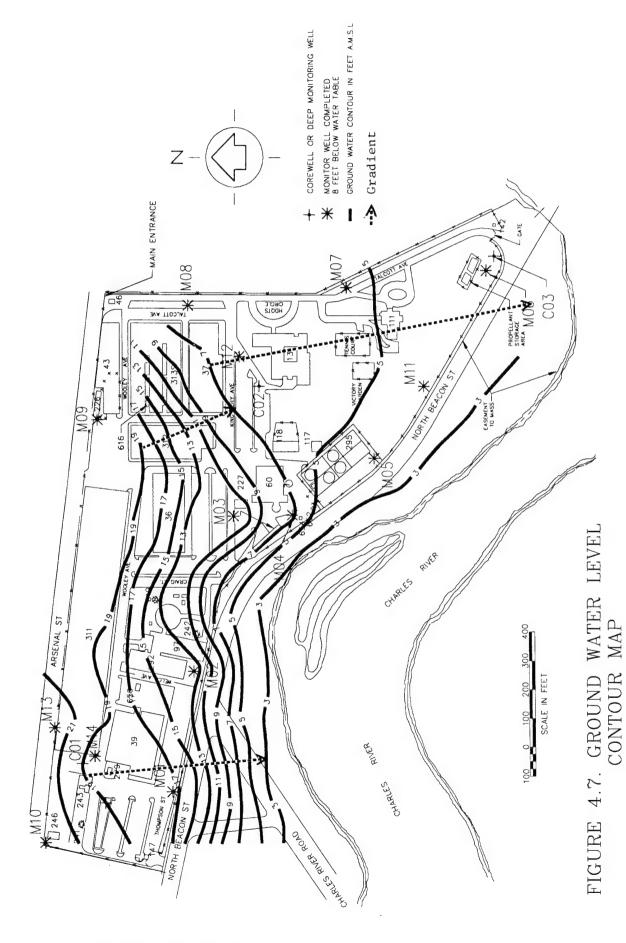
- a. Site average: 4.5×10^4 cm/sec (142 m/year).
- b. Southeast portion: 4.5 x 10⁻⁵ cm/sec (14.2 m/year).

Table 4.2 Groundwater Surface Elevations

Monitor Well	Elevation of Well* (Feet M.S.L.)	July 13, 1988 Water Depth** (Feet)	988 Water Elevation (Feet M.S.L.)	February 8, 1990 Water Depth** W (Feet) (F	1990 Water Elevation (Feet M.S.L.)
C02	37 49	31 63	70 3	00 00	
700	1100	0.10	0.00	30.99	6.5
CU3	11.90	8.45	3.45	8.13	3.78
M01	24.98	7.56	17.42	671	18 27
M02	24.04	10.49	13.55	9.25	14.70
M03	36.63	23.75	288	52.7	14.79
M04	36.52	29.19	7 33	26.32	14.30
M05	15.93	10.82	5 11	28.23	77.9
M06	11 96	\$ 15	2.01	9.32	0.01
MOZ	24.04	0.13	5.81	/.44	4.52
/0I/VI	34.84	79.67	5.17	29.88	4.97
MU8	39.48	33.70	5.78	33.15	6.33
M09	37.03	16.77	20.26	12.53	24.50
M010	32.86	11.00	21.86	9.05	23.81
M011	11.01	6.17	4.84	4.77	6.24
M012	38.52	32.14	6.38	32.23	57.0
M013	35.30	13.19	22.11	12.30	22.00
M014	35.49	17.19	18 30	15.50	10.05
			00:04	+7.71	19.93

* Elevation of well is ground surface because of flush mount.

** Depth below ground surface.



Source: Arthur D. Little, 1988

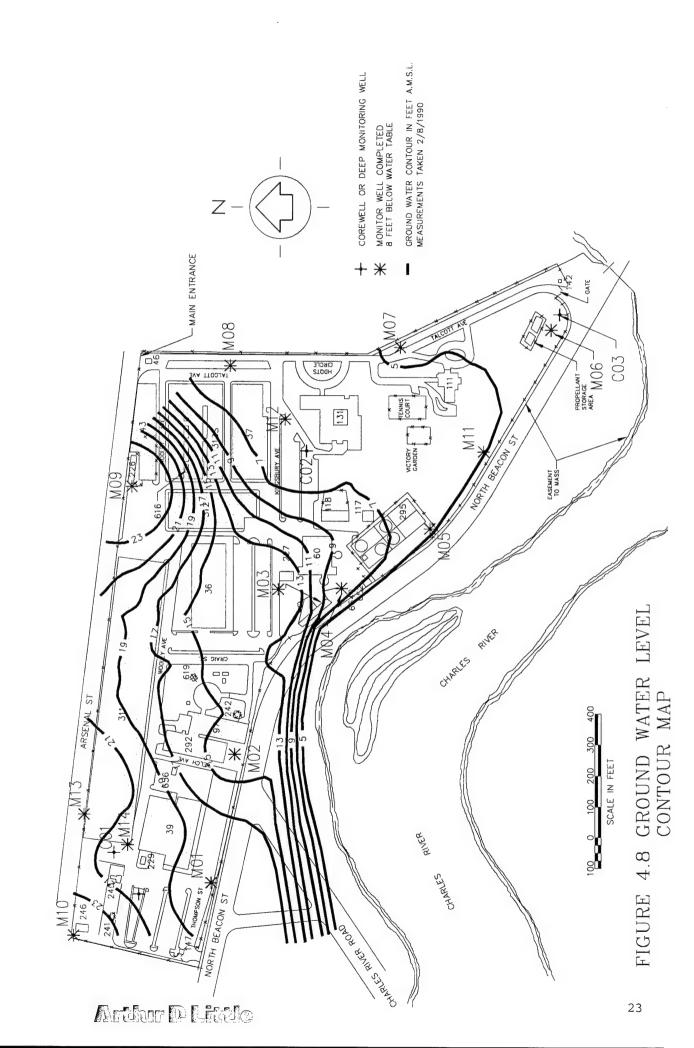


Table 4.3 Calculated in Situ Hydraulic Conductivity Measurements

Well No.	Lithology	Rising Head	Hydraulic Conductivity (cm/sec) Falling Head	(cm/sec) Laboratory
C01	Silty sand	1	ı	2.2×10^{-6}
C02	Silty sand	9.53 x 10 ⁻³	3.35×10^{-2}	;
C03	Silty sand	9.53×10^{-3}	9.18×10^{-3}	1.0×10^{-7}
MW01	Medium-coarse sand	1.20×10^{-2}	2.75×10^{-2}	2.5×10^{-7}
MW02	Fine-coarse sand	2.82×10^{-2}	3.35×10^{-3}	1.5×10^{-6}
MW03	Silty sand	4.24×10^{-2}	*	
MW04	Fine-coarse sand	2.47×10^{-2}	*	,
MW05	Silty sand	1.34×10^{-2}	*	1
MW06	Silty sand	6.35×10^{-2}	1.06×10^{-3}	,
MW07	Fine-coarse sand	6.35×10^{-2}	*	,
MW08	Medium sand	3.32×10^{-2}	1.66×10^{-2}	,
MW09	Silty sand	4.24×10^{-3}	3.04×10^{-2}	1
MW10	Medium sand	4.24×10^{-3}	6.71×10^{-3}	ı
MW11	Silty sand	7.06×10^{4}	1.41×10^{-3}	,
MW12	Fine-medium sand	3.00×10^{-2}	6.00×10^{-2}	ı
MW13	Fine-coarse sand	2.29×10^{-2}	3.07×10^{-2}	•
MW14	Silty sand	1.09×10^{-2}	*	6.0×10^{-7}

* Indicates erratic or insufficient data or insufficient displacement of water level.

⁻ Indicates laboratory tests could not be run.

(10⁻⁷ to 10⁻¹¹ cm/sec) confirming some fracturing is present int he siltstone, at least near the surface. Compacted natural clay liners for solid waste landfills are in the range of 10⁻⁷ to 10⁻⁸ cm/sec, so by comparison, the siltstone does provide an effective basal confining layer for the overlying aquifer in unconsolidated glacial sediments.

We did not determine an in situ hydraulic conductivity for the basal till. Values of k reported by Hatheway (1982) range from 10⁻⁵ to 10⁻⁹ cm/sec.

Locally, the hydraulics of groundwater movement beneath the site are controlled by the confining nature of the bedrock and the hydraulic conductivity of the silty sand. Groundwater shows a general gradient 0.03 to the south. West of MW03, the gradient increases slightly as the water encounters the lower conductivity of the silty sand. As the silty sand grades to coarser sand and sandy gravel eastward, the hydraulic conductivity increases and the gradient decreases.

To calculate a representative flow rate (Q), a cross sectional area perpendicular to the gradient extending from near MW01, then east to near MW03, and finally northeast to near MW08, approximately 2,000 feet in length was selected. The aquifer thickness (H) ranged from approximately 40 feet at the west to 47 feet at the east. We assumed that the siltstone provided an effective basal confining layer for the aquifer. The cross sectional flow area was estimated at 8080 m². Review of the drill logs and cross section MW10-MW07 (Figure 4-3) suggests that the silty sand is the predominate hydrologic unit. Review of the seismic fairly uniform material, based on consistent seismic velocities of 5,000 feet/sec. Based on the preceding arguments, a hydraulic conductivity of 6.4 x 10⁻³ cm/sec, the average for the silty sand, was used. An average gradient (i) of 0.03 was selected. The flow rate, Q, can now be calculated:

Q = k i A

 $= 0.016 \text{ m}^3/\text{sec} (98 \text{ gpm})$

 $= 504576 \text{ m}^3/\text{year} (51,508,800 \text{ gal/year})$

Representative average linear velocities can be calculated by:

v = ki/n

Using an average porosity (n) of 0.43 for the silty sand, gradients (i) of 0.03 and 0.003 and the average hydraulic conductivity (k) for the silty sand, calculated flow velocities range from 6.4 x 10⁻⁴ cm/sec (142 m/year) to 4.5 x 10⁻⁵ cm/sec (14.2m/year) where 4.5 x 10⁻⁴ cm/sec is most representative over all but the southeast corner of the site. Since the average porosity (n) determined in laboratory testing is lower than the effective porosity, these average linear velocities represent lower limits of linear velocity.

5.0 Sampling Activities

Arthur D. Little was retained by EG&G Idaho, Inc. to conduct sampling activities at the Materials Technology Laboratory, in Watertown, Massachusetts. The objective of the "resampling" episode was to perform another round of sampling activities in support of the remedial investigation. This sampling was intended to duplicate, to the extent possible, the sampling performed in 1988. Our sampling program extended from February 8 to February 23, 1990, and consisted of the collection of the following samples:

- 18 ground water samples at 16 existing monitoring wells, which included two duplicates;
- 22 shallow soil samples, which included two duplicates;
- 3 storm sewer sediments;
- 7 outfall 24-hour composite samples;
- 8 tank and sump samples (3 sludge, 2 aqueous, 3 oil); and,
- 1 water sample from the reactor emergency coolant tank.

The final list of samples varied from the original scope in that, the water sample from the reactor emergency cooling tank was added, one 24-hour composite outfall sampling site was added, one of the sumps was dry (07AQU01), so a sludge sample was taken instead of an aqueous sample, and one sludge (05SLG01) was not taken upon direction from EG&G.

Table 5.1 lists the sample identification, type, location and compounds analyzed. Figures 5.1 through 5.5 show the locations of ground water, soil, storm sewer sediment, outfall and tank and sump samples.

Copies of original field documentation, including Ground Water Monitoring Reports, Soil Sample Logs, Monitoring Well Sampling Data Sheets, Tank and Sump Sampling Data Sheets, and Chain-of-Custody Forms are included in the tabbed appendices.

5.1 Ground Water Samples

Eighteen ground water samples were taken from 16 monitoring wells, originally installed in 1988. Of the 18, two were duplicate samples taken on the day following the original sample, without repurging the well.

Table 5.1: Proposed Samples and Analytes

Sample No.

Groundwater Samples

C0-3 C0-3

MW-01

MW-02

MW-03 MW-04

MW-05

MW-06 MW-07

MW-08

90-WW

MW-10 MW-11

MW-12

MW-13

MW-14 C0-2 duplicate MW-04 duplicate

Analysis to be Performed

Complete analysis¹ Complete analysis1 Complete analysis¹ Complete analysis1 Complete analysis1 Complete analysis¹ Complete analysis1 Complete analysis1 Complete analysis1 Complete analysis1 Complete analysis1 Complete analysis¹ Complete analysis1 Complete analysis¹ Complete analysis¹ Complete analysis1 Complete analysis1 Complete analysis¹

Table 5.1 (continued)

Sample No.	Sample Location	Depth	Analysis to be Performed
Shallow Soil Samples			
01SOL01 02SOL01 03SOL01	W side of Bldg. 243 Steel floor Bldg. 311 Transformer Case, NW side	1-6 inches1-6 inches1-6 inches	Complete analysis¹ Complete analysis¹ PCB
06SUB01 06SOL01	S of Bldg. 100 Transformer area	6-18 inches 1-6 inches	Complete analysis¹ PCB
09SOL01	Transformer cage W side of Bldg. 313	1-6 inches	PCB
09SOL02	Transformer cage E side of Bldg. 313	1-6 inches	PCB
12SUB01 13SOL01	Grass area S of Bldg. 60 Transformer area, S of Bldg. 131	6-18 inches 1-6 inches	Complete analysis ¹ PCB
14SUB01 14SUB02 15SOL01	SE Corner, unit 14 NW corner, unit 14 SE corner, unit 15	6-18 inches 1-6 inches	Complete analysis¹ Complete analysis¹ Complete analysis¹
15SOL02 17SUB01 17SUB02	NW corner, unit 15 W third, unit 17 Center unit 17	1-6 inches 6-18 inches	Complete analysis ¹ Complete analysis ¹ Complete analysis ¹
17SUB03 17SOL01	E third, unit 17 E third, unit 17	6-18 inches	Complete analysis Complete analysis Complete analysis
17SOL02 01SOL01	Middle third, unit 17 W side of Bldg. 243	1-6 inches 1-6 inches	Complete analysis ¹ Complete analysis ¹
duplicate 06SUB01 duplicate	S of Bldg. 100	6-18 inches	Complete analysis ¹

Table 5.1 (continued)

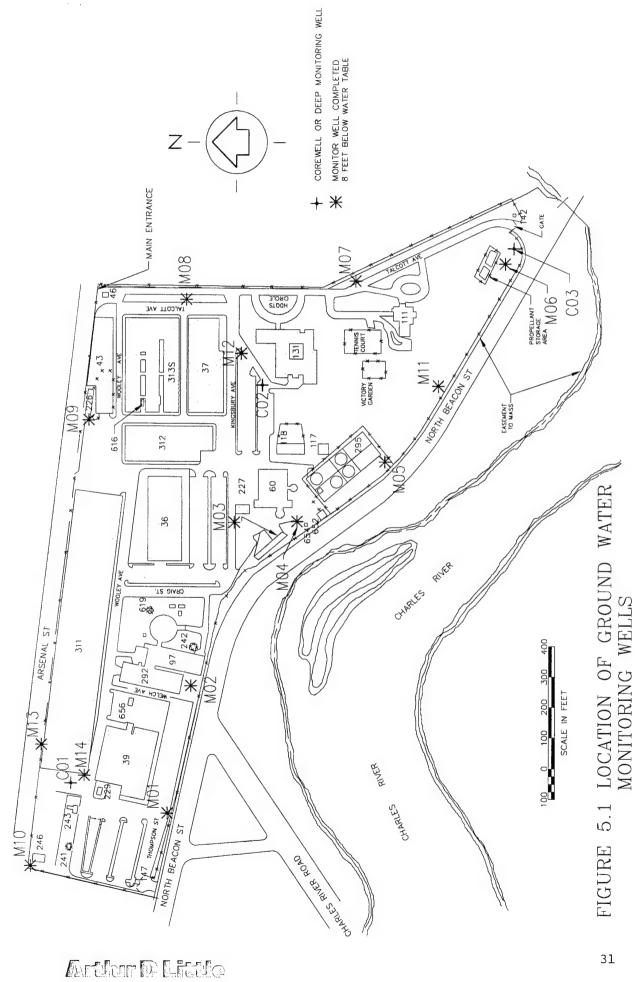
Sample No.	Sample Location	Sample Type	Sample Type Analysis to be Performed
Storm Sewer Samples			
01SED01 09SLG01	Storms sewer, NW corner unit 1 Storm sewer, corner of Woolev and Talcott	Sediment Sediment	Complete analysis ¹ Complete analysis ¹
12SLG01	Storm drain, unit 12	Sediment	Complete analysis ¹
Tank and Sump Samples			
01AQUO1	Sump, E side of Bldg. 243	Liquid	Complete analysis ¹
030IL01	W tank, Bldg. 226	Oil	Complete analysis ¹
030IL02	E tank, Bldg. 226	Oil	Complete analysis ¹
03SLG01	Floor, Bldg. 226	Sludge	Complete analysis ¹
05SLG02	Sewer cleanout W side Bldg. 39	Sludge	Complete analysis ¹
050IL01	Tank, E side of Bldg. 39	Oil	Complete analysis ¹
06AQU01	Underground tank, SE of Reactor	Liquid	Complete analysis ¹
07AQU01	Sump, Bldg. 36	Sludge	Complete analysis ¹
09AQU01	Cistern under Bldg. 313C	Liquid	Complete analysis ¹

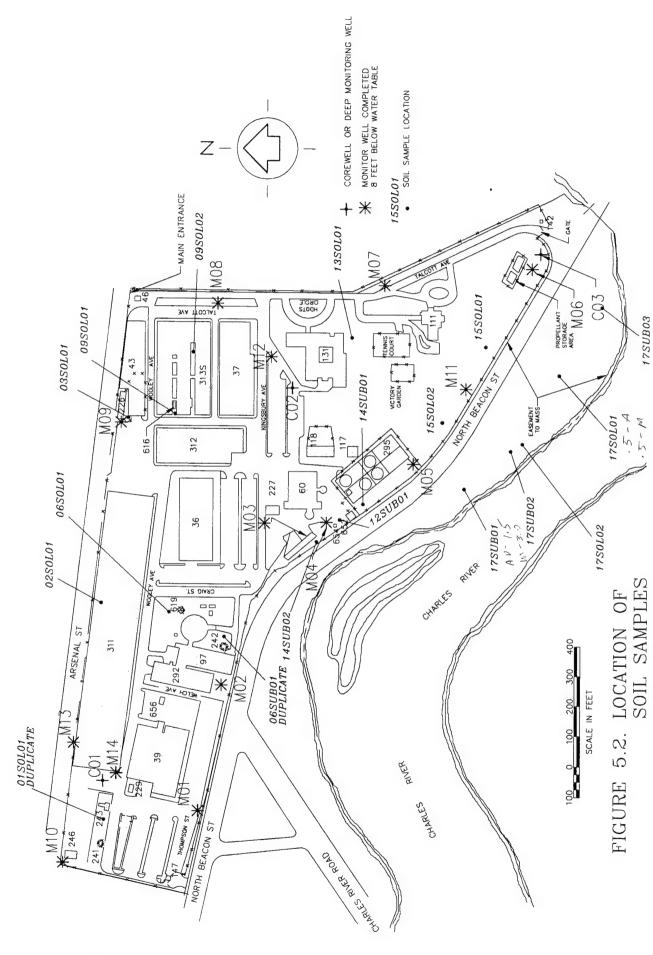
Table 5.1 (continued)

Sample No.	Sample Location	Depth	Analysis to be Performed
Sewer Outfall Samples (24 Hour Composite)	es)		
16AQU01 17AQU01 17AQU02 18AQU01 18AQU03 18AQU03 18AQU04	SE Guard Gate, Bldg. 42 SE of Bldg. 6252 E of Tank Farm E of MW-01, Parking Lot S of Bldg. 39 Wooley Ave, NE Corner Bldg. 292 Lawn S of Reactor E of MW-02, SE Corner Bldg. 292		Complete analysis¹
TB FB	Trip blanks with volatile organic samples Field blanks - 2 for soil and 2 for ground water	As required	Volatile organics Complete analysis ¹

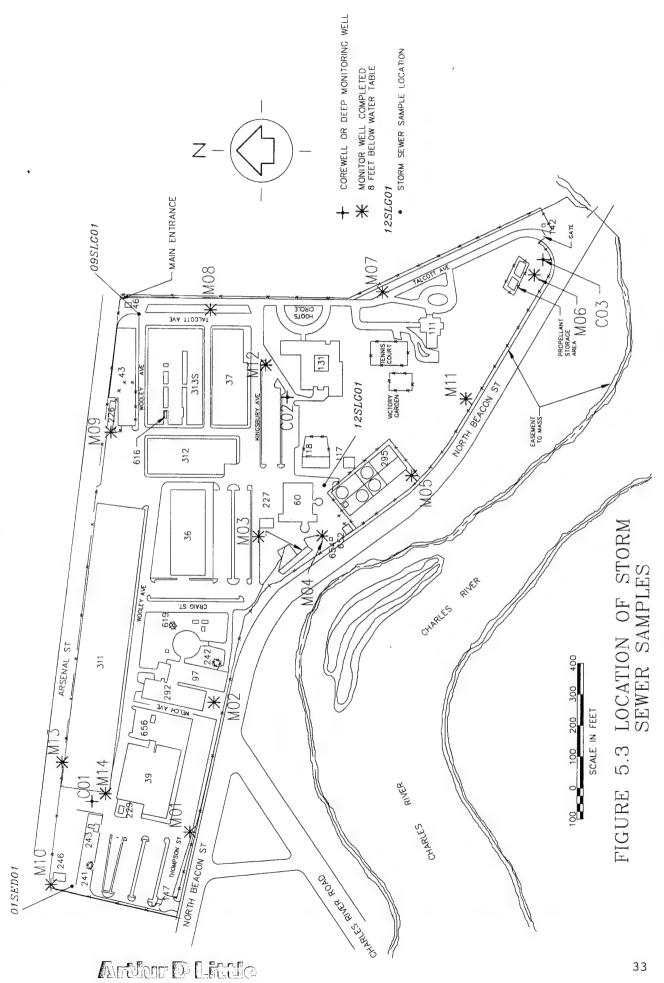
¹Complete analysis includes volatile organics, semivolatile organics, (base/neutral/acid extractables), pesticides, PCBs, metal (A1, Sb, As, Ba, Be, Cd, Cu, Cr, Co, Ca, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, T1, U, Sm, V, Zn), cyanide, and sulfide.

Metals analysis of groundwater samples refers to dissolved metals.

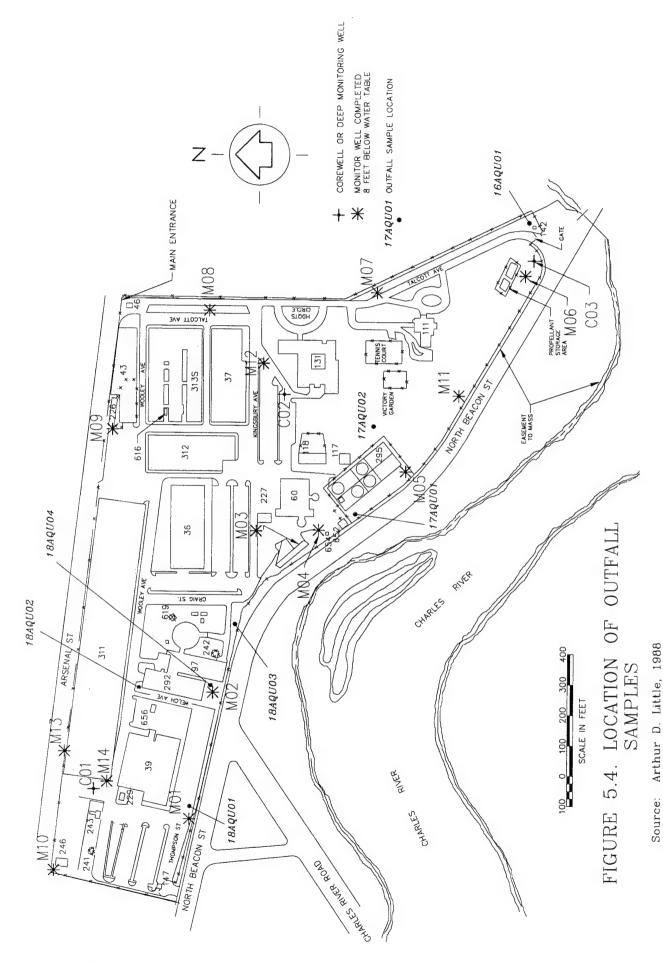


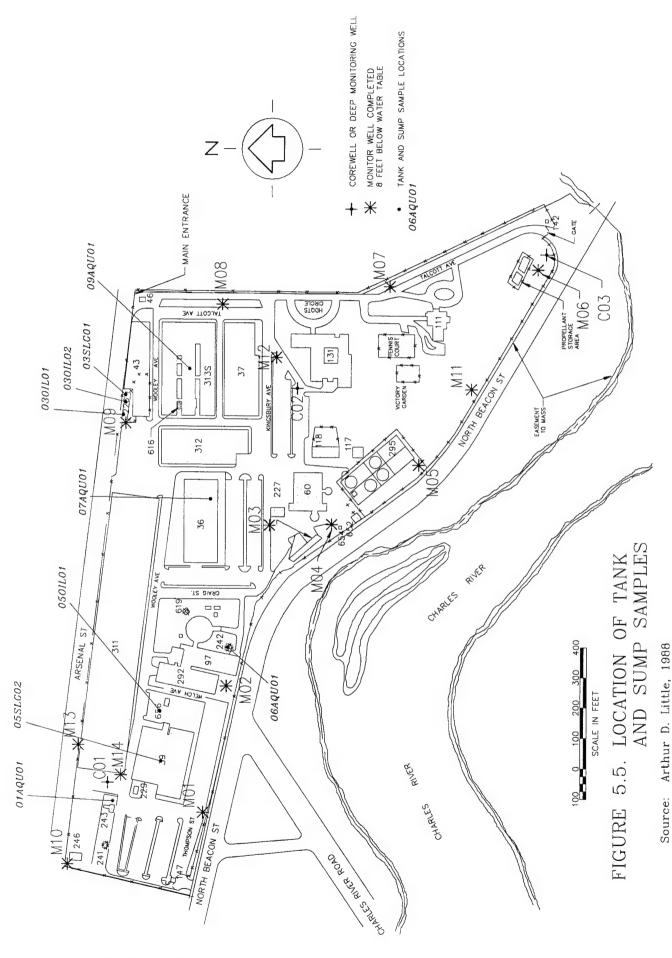


Source: Arthur D. Little, 1988



Source: Arthur D. Little, 1988





5.1.1 Methods

All wells were opened in the presence of the site health and safety officer, and the head space monitored with an HNu P-101 photoionization detector for the presence of volatile organic compounds. Readings are recorded on the water level sheets. Only well CO-2 registered above background, at approximately 200 ppm. The site health and safety officer declared that well CO-2 would be sampled with level C protection. Water levels were then measured using a Solinst electric water level probe. All wells were opened, monitored and measured (water levels) on March 8.

Wells were purged by removing 5 well and annular space (assuming 30% porosity) volumes, using a decontaminated submersible pump. Water was observed for suspended solids, temperature, pH and conductivity stabilization. Meters were calibrated according to the frequencies specified in Table 5.2. Purging was completed when the desired volume of water was removed or the well pumped dry. Well MW-03 was purged with a stainless steel bailer until it went dry. Purge water was containerized in DOT-approved 55 gallon drums and labeled with date, well number, and number of drum on both the drum and the lid.

All wells were sampled using a Teflon or stainless steel bailer which was decontaminated between wells. Samples were immediately collected for volatile organic compounds by gently pouring well water into two 40 ml, amber glass bottles with Teflon septa caps. The bottle was sealed and checked to insure that no air bubbles were trapped in the bottle. Subsequent samples were collected for semivolatile organic compounds, cyanide, pesticides/PCBs, sulfide, and metals. Sample containers used for each sample are listed in Table 5.3. Water samples taken for metals were poured into a dedicated, clean glass bottle (previously rinsed with water from the well), and filtered utilizing clean Teflon tubing, a peristaltic pump and a 45 micron SamplePro filter. Samples were preserved according to the procedures listed in Table 5.4, labeled and placed in coolers with ice. A chain-of-custody was filled out, the cooler was monitored for radioactivity using a Geiger Muller meter (all samples passed the screening), and then the cooler was sealed. At the end of each day the coolers were transported by the field crew to the Arthur D. Little analytical laboratory in Cambridge.

Sample labels were filled out and preservatives added to the sample containers in a field office set up by Arthur D. Little at the MTL. During purging, the well waters were tested for free chlorine, using potassium iodide test paper, for sulfide using lead acetate paper, pH, conductivity, and temperature. The presence of either chloride or sulfide require a different procedure for sample perservation. No chloride or sulfide were detected in any of the ground water samples collected. so routine preservation procedures were used.

Duplicate samples were collected for wells CO-2 and MW-04 on the day following the first sample. After the collection of the duplicate samples, equipment blanks

Table 5.3: Sample Container, Preservation and Holding Time

Analytes	Matrix	Bottle Size	Preservation	Holding Time
TCL+30 Volatile Organics	Soil	40mL VOA (3)	Cool <4°C	14 days
TCL+30 Semi Volatile Organics	Soil	1 x 1L Amber	Cool <4°C	7 Days (extraction) 40 Days (to analysis)
PCBs	Soil	1 x 1L Amber	Cool <4°C	7 Days
Cyanide	Soil	1 x 250 mL Amber	Cool <4°C	14 Days
Metals/TCL Metals	Soil	1 x 500 mLAmber	Cool <4°C	28 Days
TCL+30 Volatile Organics	Water	40 mL VOA (3)	HCL pH <2 Na ₂ S ₂ O ₃ if free C1 Cool <4°C	14 Days
TCL+30 Semi Volatile Organics	Water	1 x 1 gal Amber	Na ₂ S ₂ O ₃ if free C1 Cool <4°C	7 Days
Cyanide	Water	1 x 1 L Polyeth	Cool <4°C Test for sulfide with lead acetate paper, Codmium Nitrate if present NaOH pH<12 0.6 gm Ascorbid Acid if free C1	14 Days
Sulfide	Water	1 x 1 L Polyeth	2mL/L 2N ZnAcetate NaOH pH >9 Cool <4°C	7 Days
Metals/TCL Metals	Water	1 x 1 Polyeth	HNO ₃ pH<2	28 Days

Table 5.4: Water Sample Preservation

Volatiles - Test for presence of free chlorine using potassium iodide test

paper. If present add sodium thiosulfate at level of 0.008% per Liter (1 drop 1N/40mL). Adjust pH of solution to pH <2 with

HCL (4 - 6 drops conc HCL/40mL).

Semi-volatile - Test for presence of free chlorine using potassium iodide test

paper. If present, add sodium thiosulfate at level of 0.008%

per Liter (2mL/Gal).

Cyanide - Test for presence of sulfide with lead acetate paper. If present,

add cadmium nitrate until sulfide no longer detected. Test for presence of free chlorine with potassium iodide paper. If present, add ascorbic acid at rate of 0.6 gm per Liter. Add

Sodium Hydroxide to pH > 12 (2-5 mL/Liter).

Sulfide - Add 2 mL/Liter of 2N Zinc Acetate solution.

Add NaOH to pH>9 (2-4 mL/Liter)

Metals - Add HNO₃ to pH<2 (2-5 mL/Liter)

(2) were taken by decontaminating the bailer and then capturing distilled, deionized water passed through the bailer.

The bailers were decontaminated between each well by triple rinsing in distilled, deionized water. The clean bailers were wrapped in aluminum foil to prevent contamination during transport and handling between wells. PVC gloves were used to handle all clean equipment. Dedicated bailer twine was used for each well. Rinse water was collected and drummed in the same manner as the purge water.

5.1.2 Modifications

The only modifications to the original work plan were the use of a stainless steel bailer in addition to the Teflon bailer and the need for level C protection in the collection of the sample and duplicate for well CO-2.

5.2 Soil Samples

Twenty-two shallow soil samples were taken from locations specified by EG&G, approved by USATHAMA and staked by the Arthur D. Little Project Manager. Two of the 22 samples were duplicates. These sample locations correspond to original soil sampling locations.

5.2.1 Methods

All soil samples were collected using a decontaminated 3-inch stainless steel bucket-type hand auger. An area approximately 6 inches in diameter was cut in the sod using a decontaminated stainless steel trowel to remove the sod and root zone from the sample area. Surface soil samples were taken at a depth from approximately 1 to 6 inches depth; subsurface samples were taken at approximately 6 to 18 inches depth. To obtain the desired volume, several holes were made adjacent to one another. The sample for volatile organic compounds was taken immediately by rapidly filling 2 40ml amber, glass bottles as full as possible to eliminate head space, and capped with a Teflon septa seal. Subsequent samples were taken for semivolatile organic compounds, pesticides/PCBs, metals, cyanide, and sulfide. Five samples, taken adjacent to transformers, were taken only for PCBs (03SOL01, 06SOL01, 09SOL01, 09SOL02, and 13SOL01). Sample containers used are listed in Table 5.3. Sample containers were labeled, placed in a cooler with ice, a chain-of-custody was filled out, the cooler was monitored for radioactivity with a Geiger Muller meter (all samples passed the screening), and then sealed. At the end of each day, the field crew transported the cooler to the Arthur D. Little analytical laboratory in Cambridge.

Duplicate samples were collected at 01SOL01 and 06SUB01.

The soil auger and trowel were decontaminated by first scrubbing the equipment with a nylon-bristle brush to remove soil and debris adhering to the equipment.

They were next scrubbed with MTL tap water and a nylon-bristle brush, and finally triple rinsed in distilled, deionized water. Decontaminated equipment was wrapped in aluminum foil to prevent contamination during transport and handling between sites. All clean equipment was handled with latex rubber or PVC gloves.

5.2.2 Modifications

The only modification to the original work plan involved the taking of the equipment blanks. Normally these are taken after a piece of sampling equipment is decontaminated after the last event of the day or after a site suspected to be contaminated is sampled. We specified taking the equipment blank after the duplicate samples. This was inadvertently omitted by the field crew. To correct this omission, each duplicate sample site (01SOL01 and 06SUB01) was resampled, the sample discarded, the hand auger decontaminated according the specified procedure, and an equipment blank taken by passing distilled, deionized water through the auger bucket, and collecting it in the proper sample containers. A memorandum documenting this event is included with the chain-of-custody record.

5.3 Storm Sewer Sediment Samples

Three storm sewer sediment samples were collected from storm sewer catch basins at locations specified by EG&G and approved by USATHAMA. These sample locations correspond to original sampling locations.

5.3.1 Methods

Prior to removing the storm sewer grate, the catch basin was monitored for radioactivity with a Geiger Muller meter and for volatile organic compounds with an HNu P-101 photoionization detector. All catch basins were approved for sampling. The grate was then removed and a sediment sample taken. Samples were taken using a decontaminated Pyrex glass beaker attached with a stainless steel clamp to a wood extension pole. Sample containers used were the same as that specified for soil samples in Table 5.3.

The first sample taken was for volatile organic compounds; subsequent samples were taken for semivolatile organic compounds, pesticides/PCBs, cyanide, and sulfide. Samples were labeled, placed in a cooler with ice, a chain-of-custody completed, monitored for radioactivity with a Geiger Muller meter (all samples passed the screening), and then sealed. At the end of the day the sample cooler was transported to the Arthur D. Little analytical laboratory by the field crew.

No duplicate samples were taken as none were required in the scope of work.

Decontamination of the Pyrex beaker used for sampling was performed using the procedure described previously for the soil sampling equipment.

5.4 Outfall 24-Hour Composite Samples

Seven outfalls were sampled by collecting a 24-hour composite sample at each outfall location. The outfalls were all on the MTL property at locations designated by EG&G, and approved by USATHAMA. These samples correspond to original sample locations.

5.4.1 Methods

To guarantee the security of the samples, they were taken manually rather than with an automatic sampler. The 24-hour composite was developed by taking a subsample at 4 hour intervals on February 22 and 23, at 2130 hr., 0130 hr., 0530 hr., 0930 hr., 1330 hr., and 1730 hr. Using a decontaminated stainless steel dipper, 1.5 liters was obtained of the discharge flowing from the pipe and placed into a clean 10 liter glass compositing jar, one for each outfall. As there was no flow in the outfall for sample 17AQU01, standing fluid was sampled from the sump. Samples for volatile organic compounds were taken as a single sample during the initial February 22 2130 hour event. Samples for semivolatile organic compounds, pesticides/PCBs, metals, cyanide and sulfide were taken as aliquots from the 10 liter compositing jar at the end of the 24-hour event. Samples were placed in containers and preserved according to the specifications in Tables 5.3 and 5.4 for water samples. Metals were not filtered, however, since it was felt that particulate transport of adsorbed metals was a significant transport mechanism for the discharge. Samples were labeled, placed into a cooler with ice, a chain-ofcustody completed, the cooler was monitored for radioactivity using a Geiger Muller meter (all samples passed the screening) and the cooler then sealed. At the end of the 24-hour sampling event, the coolers were transported to the Arthur D. Little laboratory in Cambridge.

No duplicate samples were taken, as none were required in the scope of work.

The stainless steel dipper was decontaminated between outfalls by triple rinsing in distilled deionized water.

5.4.2 Modifications

In the work plan we had specified taking the subsamples from the outfall with a Pyrex glass beaker, but due to equipment availability were able to use a stainless steel dipper designed for such sampling. We had also suggested in the original sampling plan that 2 samples be taken for volatile organic compounds, one during the night and one during the day to capture diurnal variations in the discharge that might be due to variation in the operations at MTL over the 24 day. At the direction of EG&G, only one sample for volatile organic compounds was taken from each outfall.

5.5 Tank and Sump Samples

Eight samples were taken from tanks and sumps; 3 sludge samples, 2 aqueous samples and 3 oil samples.

5.5.1 Methods

Prior to sampling, all tanks or sumps were monitored with an HNu P-101 photoionization detector. The three sludge samples (05SLG02, 03SLG01, and 07AQU01 - no fluid in sump so a sludge sample was taken) were collected using a decontaminated Pyrex glass beaker and filling the appropriate sample container listed in Table 5.3 for soils. Samples for volatile organic compounds were taken first.

The two aqueous samples (01AQU01 and 09AQU01) were taken with a decontaminated bailer. Aqueous samples were placed in the appropriate sample containers as listed for water in Table 5.3, and preserved according to the specifications of Table 5.4.

The 3 samples of oil were obtained with a dedicated, decontaminated Teflon bailer, accessing the tanks through the vent stacks. Portions of the piping were removed by MTL staff to facilitate the sampling. Samples for volatile organic compounds were taken first using 2 40 ml amber, glass bottles with Teflon septa screw caps. Care was taken to make sure that no air remained in the sample bottle. An additional 500ml amber, glass bottle was filled for the remaining analytical requirements: semivolatile organic compounds, pesticides/PCBs, metals, cyanide, and sulfide.

5.5.2 Modifications

A sample originally designated for a storm sewer clean-out under Building 39 (05SLG01) was not taken at the direction of EG&G, since there was no flow or sludge. A sample from a sump in the basement of Building 36 (07AQU01) which was originally designated as an aqueous sample was taken as a sludge sample, at the direction of EG&G, since there was no liquid in the sump. While our work plan assumed all sampling would be at level D, and excluded confined space entry work, a sludge sample taken from the tank vault (03SLG01) was taken under the supervision of the site health and safety officer, with the sampler wearing an SCBA. Entry was made after the tank vault had been suitably ventilated, using Arthur D. Little's procedures for confined space entry.

5.6 Water Sample from the Reactor Emergency Coolant Tank

Two water samples were taken from the reactor emergency coolant tank.

5.6.1 Methods

Two water samples were taken from the emergency reactor coolant tank by the site health and safety officer, who is also Arthur D. Little's Radiation Safety Officer. Before the sample was taken, the tank was monitored with a Geiger Muller detector for radioactivity; no abnormal readings were detected. The samples were taken by immersing a 1 gallon, amber glass sample bottle in the tank. Access to the tank was gained through a trap door. The samples were preserved by adjusting the pH to less than 2.0 with nitric acid. The samples were labeled, screened for radioactivity with a Geiger Muller meter, placed in a cooler with ice, a chain-of-custody completed and the cooler sealed. The cooler was transported to the Arthur D. Little analytical laboratory in Cambridge by the field crew.

5.6.2 Modifications

Two samples were taken from the cistern. One was included in the original scope of work and one sample was not included. The sample called for in the sampling plan was taken and analyzed for non-radiological contamination. The additional sample was taken by Arthur D. Little personnel, then shipped to EG&G Idaho for radiological analysis.

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Well No. C-02 **Ground Water** Client E6+6 **Arthur D Little Monitoring Report Project** Case No. Date Installed Date Developed LOCATION Measuring and Sampling **Measuring Point** Equipment Used HNU AD Calibrated at 0830 Description Flush w/well now t Sikground U.S ppn Electric Water Local Mates Elevation Total Total Depth Water Measuring Date Time Read Organics Well Remarks To Surface **Point** $\mathbf{B}\mathbf{y}$ (ppm) Depth Water Elevation HALL reading in well 1 1 6 = 200 ppm Will opening 5-10 ppm - Beathing Zone U.Sppm 1120 1120 90 37.49 30 117" 200 6.5 RNL Modified Level D for well purger is necessary. Level Cull be implemented of deaper newsgary 38.99 CBTY of positions hegin.

Date In	stalled Measi	P Little	nt		VIo Date	Develop Measur Equ PNa PID Bookspand Elastin Co	ed ing and iipment	Sampling Used	Well No. (103) Client E6+6 Project Case No. LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	1	epth To ater	Water Surface Elevation	Total Well	Rem	arks	Read By
2-08-70	1312	0.6	11 90	-	17,,,	3.78				CBM
				_	125					
,										
					_					
							1			

Date I	nstalled Measo	D Little	int	Mo	Develop Measur Equ HNU FID RECKGRAND Electric W	ng Re ed ing and uipment	Sampling Used	Well No. MW-01 Client EG+G Project Case No. LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth		Remarks	Read By
1-8-10	\$1030	0.5	24.98	681	18 27				RNL
				6.71					1
		,							
									-
									-
									<u> </u>

Date Ir	nstalled Measi	D Little uring Poi	nt	Mo	Equ 14Ni. PIG	ng Re	Sampling Used	Well No. MW Client E6+0 Project Case No. 6145 LOCAT	3
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Re	marks	Read By
	1038	Ö.lg	24.04	9'3"	14 79				RIIL

Date Ir	nstalled Measu	D Little	nt	Mo	Develop Measur Equal Hall PID Burkyound of Electric Wi	ng Re	Sampling Used	Well No. MW-0 Client E646 Project Case No. 61453 LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Re	emarks	Read By
3-08-90	1078	0.5	36.63	22'4" 22.33	14.30				RML

Date Ir	nstalled Measi ption	D Little uring Point Flush wheel	nt	Mo	Develop Measur Equ Hila filo Brikyand Electric wi	ed ing and uipment	Sampling Used	Well No. MW-04 Client E646 Project Case No. 6453 LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Ren	narks	Read By
J-08-70	1054	0.6	3652	2813"					RNL
				28.25					1,11,12

Date In	istalled Measi			Mo	Equation of the parties of the parti	ed ing and uipment	Sampling Used	Well No. MW-Client Long-Project Case No. LOCAT	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth		Remarks	Read By
				C 34					

Date I	installed Meas	Uring Po	int	Dat	Groun Onitori e Develop Measur Eq HM. PM bacquid g	ng R ped ring and uipmen	d Sampling	Well No. Mw - C Client (6+6- Project Case No. LOCATION	
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Ren	narks	Read By
). 3.24.	1376	0.6	11 96	7'54 7.44	4.52				CBIN
				_					

Date Ins	talled Measu	Little uring Poi	nt	Mo Date	Develope Measur Equal No. PID Sockgand	ed ing and lipment	Sampling Used		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth		Remarks	Read By
3 05 -90	(30)		34.84	29' WJ" 29.88	4.97				RNL

Date Installed Measuring Point Description Floh Wall mast Elevation					Develop Measur Equ HNU PIP () Sackgrand Electric (c)	ed ing and	Sampling	Well No. MW-08 Client E646 Project Case No. LOCATION		
Date	Time	Total Organics (ppm)	Measuring Point				Rem	arks	Read By	
7-45-90	1146	0.6	39.48	33'12"					RNL	
				33 15						

Date II	nstalled Measi ption	D Little uring Poi	nt	Mo	Develop Measur Equation PID Suksyard Walter Land	ed ing and uipment	Well No. Mw CG Client E6+6 Project Case No. UH53 LOCATION			
Date	Time Organics (ppm) Measurin		Measuring Point	То				Remarks		
J-08-50	1154	0.6	37.03	12'63"	24.50				RNL	
				12.53						
									1	
									 	
			·							
									-	

Date Installed Measuring Point Description Floral well Mont Elevation				Mo	Develope Measur Equality PIO -	ed ing and lipment	Well No. MW-10 Client EG+G Project Case No. LOCATION		
Date	Time	Total Organics (ppm)	Measuring Point	To Surface Well Remains Water Elevation Depth			narks	Read By	
2-8-90	0953	0،6	Flush w well mount	95"					RHL
W 0 10			32.86	9.05	23.81				
,									

Date In	stalled Measu	P Little		Mo	Develop Measur Equal Backgard Elattic a	ed ing and iipment	Well No. With Client Forect Project Case No. LOCATIO	Client F646 Project		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Re	Remarks		
	\353		11.01	4.77	6.24				KIL	

Date In	stalled Measu	Little uring Poi	nt	Mo	Develop Measur Equ HMu PIE C Buckgrund of E bectire w	ed ing and sipment	Well No. 1 W-12 Client 16 46 Project Case No. 61453 LOCATION			
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	Re	Remarks		
9-03-10	[13]	0.5	38 5 2	32'33"	6.29				ENT.	

ate	nstalled	D Littl		Mo	Ground onitoria Develop Measur	ng Re	Sampling	Well No. MW-13 Client EG+G Project Case No. LOCATION		
es leva		Flosh w/w		ţ	Hu PID . (Bukgard - c Electura wi	Jipment alistakel od otar Leval				
ate	Time	Time Organics Point Point		Depth To Water	Water Surface Elevation	Total Well Depth	Re	marks	Read By	
08.4	1008	04.		12' 37"					RIL	
			3 5.30	12.30	23.00					
1										
_										
-										
										
-										

Date Ir	nstalled Measi	P Little	nt	Mo	Develope Measur Equ HN P10 Schgrend Electric	ed ing and iipment	Well No. MW-14 Client EG+G Project Case No. LOCATION		
Date	Time	Total Organics (ppm)	Measuring Point	Depth To Water	Water Surface Elevation	Total Well Depth	F	Remarks	Read By
2-8-10	1018		35.49	15.54	19.95				RHL

					Well No. CO-2					
	Mon	itoring W	Vell Sami	. 1: ~	Client EG+G/USATHAMA					
Arthur D Little		Data S		, –		4-WATERTOWN				
		Data	Sheet							
Evacuation Method		Date			Case No. 6/453-50 LOCATION					
Pump (SUBMERSE	816)	2-1	2-90							
Sampling Method BRELER (LEVEL C)		Equipment U	Jsed (Calibra	ited(Y/N)	#37 N					
BASIER (LEVEL C)		HNU-PID,	TEMP/Con	annannu.	(5)					
Sampling Personnel T.Fo.		Initial Well 1	PID (ppm)	88 ppm	and the					
C.MARTEL, S. FOSTE		<u> </u>			C-2	13/				
WELL VOLUME (* us	se appropri	ate values in t	able for each							
${f V}$ well	Depth	Screen Bottom	Depth Water		lons of Water (well)					
.60	x [(3	8.48 -	34.34	□)]= □	2.73					
ANNULAR VOLUME	(ASSTIM	F 30% DOD	OSITV)			····				
ANNOLAR VOLUME	(ASSUM	E 30% FOR	Depth	Gal	lons of Water					
V annulus		Screen Bottom	Bottom of Se	al	(annulus)					
1.06	x [(3	B.48 -	34.34)]=	4.38					
WATER TO BE REMO	OVED									
Gallons of Wa		ons of Water	Removal	Total Gallor be Remov		Actual Gallons Removed				
(well) [(2.73	7 + 🗂	(annulus) 4.39	x Multipier	= 35.6		35				
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	A			Annulus *				
MEASUREMENTS					Well					
Well Purging			Free CL	Dissalus	Vwell	dia V annalus				
Time pH	Conduct.	Temn	ØN	Dissolved Oxygen	2"	6.5 0.46gal/ft 7.25 0.59gal/ft				
1608 6.49	0.42	Temp.	No		0.17gal/ft	7.75 0.69gal/ft				
1616 6.5	0.33	15.6°C	No	-		8.25 0.79gal/ft				
1625 6.4	0.34	14.4°C	No			8.25 0.64gal/ft				
1632 5.5	0.32	15.0°C	NO	-	. 4" 0.66gal/ft	10.25 0.04gal/ft				
Dord Consulting					· 0.00gai/it	12.25 1.63gal/ft				
Post Sampling					6"	12.25 1.41001/64				
					1.5gal/ft	12.25 1.41gal/ft				
SAMPLING										
Decontamination Procedures (Jsed	Detergent Wash	, Water Rinse,		Detergent Wa	ish 🗹 Other				
Solvent Used ————		Solvent Rinse,	WaterRinse	`	Water Rinse	3x D.I. H20				
	Volume	Filtered	_			RINSE				
Sample ID Analysis 7(C+30 Yol.	(ml) 40	(Y/N)	Preservation		Container K. GL#55 (Time (3) 1705				
CO-2 761+30 Sems	1 GALLON	No	Ice.	"	11 (1) 1705				
CO-2 CYANSOE	1.l	No	Ice NOON,	HTIZ POLY	ETHYLENE					
CO-2 Suiffet	11	No	AZEG NADH P			1705				
CO-2 METALS	11	YES	Ict HNO	oH <2 "	10					
			\			1705				
			+ ZN ALETI							
Notes (include data on fl	oaters/sink	ers with meas	uring device,	well condition	on, etc.)					
SAMPLED WELL				, ,	PADENL					
BREATHENG BONE	Exclus	EON ZONE	was DE	FINED.	THIS WEL	L WILL BE				
DUPLICATE SAMPLE	D TOMOR	MON AFTER	SITTENG	FOR 241	YOURS.					
Sigature	1 des	1	Date 2-12	2-90 No.	of Bottles	7				
Medferr I										
M5/Fight F	조그도 합니다.									

	Mon	itoring W	ell Sam	Well No. CO-3 Client EG+G/USATHAMA						
Arthur D Little		Data S	Sheet	. 0		MIL-WATERION				
		2000				Case No. 61453 - 50				
Evacuation Method		Date		LOCATION "						
PUMP (SUBERS	18LE)		4-90		BUNKERS	1 \$//				
Sampling Method		Equipment U								
BATLER		HNO-PEO,		MO GUARD						
Sampling Personnel A. F.	PATHER	Initial Well I	PID (ppm)	D.Gppm	20.35	SOUTH CATE				
WELL VOLUME (* us	se appropri	ate values in t	able for each	code letter)	• • • • • • • • • • • • • • • • • • • •				
V well	Denth	Screen Bottom	Depth Wate		allons of Wat	er				
.66		3.07 -	7.73]] = [(well) 16.7	¬				
ANNULAR VOLUME	- \			/]						
			Depth	G	allons of Wat	er				
V annulus		Screen Bottom	Bottom of Se		(annulus)					
1.06	x [(3	3.07 -	7.73])]=	26.9					
WATER TO BE REMO				Total Gall	ons to	A same I Co II				
Gallons of Wat (well)		ons of Water annulus)	Removal Multipier	be Remo		Actual Gallons Removed				
[(16.7		26.9)]	x 5	= 218		220				
					Well	Annulus *				
MEASUREMENTS					Vwell	dia V annalus				
Well Purging			Free CL	Dissolved		6.5 0.46gal/ft				
Time pH	Conduct.	Temp.	ØŇ	Oxygen	2"	7.25 0.59gal/ft				
1007 6.69	0.65	13.0°C	No	-	- 0.17gal/	7.75 0.07gal/It				
<u> 1030 </u>	0.87	13.0°C	No		_	8.25 0.79gal/ft				
1127 6.53	0.88	12.9°C	No	-	- 4"	8.25 0.64gal/ft				
1255 6.60	0.86	12.9°C	No	-	0.66gal/	ft 10.25 1.06gal/ft				
Post Sampling 6.70	0.70	13.1°C	No	•		12.25 1.63gal/ft				
					- 6" 1.5gal/i	ft 12.25 1.41gal/ft				
SAMPLING										
Decontamination Procedures U	Jsed	Detergent Wash	. Water Rinse.		Detergent V	Wash 🗹 Other				
Solvent Used ————		Solvent Rinse,			Water Rins	e 3x D.I. H2O				
	Volume	Filtered				RINSE				
Sample ID Analysis	(ml) _40 mL	(Y/N)	Preservation		Container	Time 5 (3) 1444				
CO-3 7CL+305emi.	1 GALLON		Ice de	II AM	SEK GLHS	(1) 1444				
CO-3 CYANZOL	11	No		ON 112 POL						
CO-3 SHEFEOF	11	No	Ice, NOON	N79 11	"	1444				
CO-3 METALS	12	Yes	ICE, HNO, P		11	1444				
Notes (include data on flo	oaters/sink	ers with measu	ıring device,	well condit	ion, etc.)					
FILLED 3 DRUMS,	HAD TO	STOP PUN	APING T	EL ADDS	TEONAL	PRUMS				
ARRIVED. STOPPEL	Pump	SNG 1127,	RESUMEO	PUMPS	NO 125	5, completed				
PUMPEND 1322.		, ,				-				
Sigature Z	, 17	<i></i>	Date a. /	1-90 No	of Rottle	. 7				

Arthur D. E-Fato

		_			Well No. MW-0/				
Aut BItul	Mon	itoring W	ell Samp	ling	Client £6+6				
Λrtlur D Little		Data S	_		Project A				
					Case No. 6				
Evacuation Method		Date 2.	8-90	LOCATION					
Pump (SUBMERS) Sampling Method	BLE)		sed (Calibrat	ed(VAI)		BLA	6. 39		
BATLER		How-PID Con							
	RINER	Initial Well I	PID (ppm)	WM-01 N					
P. Co			0	NORTH BEACON ST.					
WELL VOLUME (* us	se appropri	ate values in t	able for each	code letter)					
${f V}$ well	Depth :	Screen Bottom	Depth Water	Ga	illons of Water (well)				
.66	x [(16.2 -	5.77]]=[6.9				
ANNULAR VOLUME	(ASSUM)	E 30% POR	OSITY)			·			
V annulus	Denth	Screen Bottom	Depth		llons of Water				
1.06		16.2 -	Bottom of Sea	<u> </u> 	(annulus)				
WATER TO BE REMO									
Gallons of War		ons of Water	Removal	Total Gallo		Actua	l Gallons		
(well)		(annulus)	Multipier	be Remo		-	noved		
[(+	<i> </i> .05	x <u>5</u> =	89.7					
MEASUREMENTS					Well		nulus *		
Well Purging			Free CL	Dissolved	Vwell	dia	V annalus		
Time pH	Conduct.	Temp. //.0°C	ØŊ	Oxygen	2"	6.5 7.25	0.46gal/ft 0.59gal/ft		
1455 6.0	1.89	11.0°C	No	-	- 0.17gal/ft	7.75	0.69gal/ft		
<u> 1520 6.0</u> 1530 6.0	2.40	10.0°C	No		-	8.25	0.79gal/ft		
1530 6.0 1546 6.0	2.38 2.3/	10.0°C	No		- _{4"}	8.25	0.64gal/ft		
1603 6.0	2.28	10.0°C	No	-	- 0.66gal/ft	10.25	1.06gal/ft		
Post Sampling						12.25	1.63gal/ft		
					6" 1.5gal/ft	12.25	1.41gal/ft		
SAMPLING			****		1108.011	.			
Decontamination Procedures U	Jsed	Detergent Wash	. Water Rinse,		Detergent Wa	sh	Other		
Solvent Used ————		Solvent Rinse,		_	Water Rinse	3x	D.J. Heo		
	Volume	Filtered	_			K	ZW3E		
Sample ID Analysis	(ml) 40 ml	(Y/N)	Preservation	n '42 <i>A</i> aaa	Container <i>Med Genss (3</i>))	Time		
MW-0/ TCL+3056M2	1 GALLON		Les	11	¥ (1)		135		
MW-0/ CYMNEOE	11	No	ICE, NOON,		ETHYLENE		135		
MW-01 Suiffor	12	No	206, NO ON ,		"		135		
MN-0/ METALS	11	YES	ICO, NNO, P		4		135		
Notes (include data on fl	oaters/sink	ers with measi	ring device.	well conditi	on, etc.)				
WATER IS CLEAR			· · · · · · · · · · · · · · · ·		, 5001)				
Sigature	- J		Date <u>2/3/9</u>	Po No.	of Bottles	7			
	/				_		_		

Anthrop D. Little

	N 10-11 mg	Mon	itoring W	ell Samı	oling		ell No. //	,	
Arthur I) Little		Data S		. 0	Pr	oject <i>am)</i>	re-Wa	TERTOWN
Evacuation M			Date	2.00		C		<i>1453</i> ATION	
Sampling Me	P (Susmer	(538LE)		8 - 90	tod(V)N		*	V	2
Sampling Me			Equipment U	Seu (Calibra	ted (MIN)	ایس	1		2/91
Sampling Per		RINER	Initial Well I	OID (nnm)			mw	-02	7/3
	P. Co			L	.Gppm		VORTH BEAC	ON SIN	ect .
WELL VOI	LUME (* us	se appropri	ate values in t	able for each	code let				
	${f V}$ well	Depth	Screen Bottom	Depth Water			ns of Water (well)		
	.66	x [(16.42 -	8.84	囗)]=		5		
ANNULAR	VOLUME	(ASSUM	E 30% POR	OSITY)					
	V annulus			Depth			ns of Water		
Г	7.06		Screen Bottom	Bottom of Se	<u>al</u>)]=		nnulus) .02		
WATED TO			9,72	0.07					
WATER TO	Gallons of Wa		lons of Water	Removal		Gallons		Actua	l Gallons
r	(well)		(annulus)	Multipier		emoved	!]		moved
L	(5	+	8)]	x _ 5	=	5			05
MEASURE	MENTS						Well		nulus *
Well Purging				Free CL	Diago		Vwell	dia	V annalus
Time	ρΗ	Conduct.	Temp.	WN N	Disso Oxyg		2"	6.5 7.25	0.46gal/ft 0.59gal/ft
1200	6.5	1.32	12.0°C	No			0.17gal/ft	7.75	0.69gal/ft
1220	6.0	1.54	12.0°C	No				8.25	0.79gal/ft
1325	6.0	1.5	13.0°C				4"	8.25	0.64gal/ft
							0.66gal/ft		1.06gal/ft
Post Samplin	ıg							12.25	1.63gal/ft
							6" 1.5gal/ft	12.25	1.41gal/ft
SAMPLING	7				<u>-:</u>			L	
Decontaminati	on Procedures (Jsed	Detergent Wash	, Water Rinse,		☐ De	tergent Wa	sh	Other
Solvent Used			Solvent Rinse,			W:	ater Rinse		D.I. H2O
		Volume	Filtered	D		0		1	RINSE
Sample ID	Analysis 7CL+30 Voc.	40 ml	(Y/N)	Preservation			ntainer <i>GL#85 (</i> 3	:) /	Time 1233
MW-02	TCL+30 SEME	1 GALLON		Ice		11	11 (1		233
MW-02 MW-02	CYANSDE SULFEDE	12	No	Ict, NOON		OLYETH '	YLENG		233
1110002	JULFIBE			Ist NOONP					233
mw-02	METALS	12	YES	Ice HNO,		^	**		233
Notes (inclu	ide data on fl	oaters/sink	ers with measu	ıring device,	well cor	dition	, etc.)		
THE WATE	ER IS CLE	PR							
		, ~	,		/				
Sig	ature	end. Lo	1	Date <u>2/8/</u>	90	No. of	f Bottles _	7	_
	Author L		-						
	ESTRICTER	가득하다[[HET4] 10.	***						

Arthur D Little	Mon	itoring V Data		plin	g C Pi	ell No. <i>Ma</i> lient ∡ 6 • 6 roject _{Ama} ase No. 6	<u> USA7</u> - JA	HAMA TEATOWN
Evacuation Method BAZLER Sampling Method		Equipment (4				ATION	
c. mi	RINCR	Initial Well	PID (ppm)	0.5		Smoke STA		60
WELL VOLUME (* us V well	Depth S	Screen Bottom	Depth Wat	er	Gallo	ns of Water (well) マ		
V annulus	Depth S	E 30% POR Screen Bottom 25.05 -	OSITY) Depth Bottom of S	· ·	(a	ns of Water nnulus)		
WATER TO BE REMO Gallons of Wate (well)	ter Gall	ons of Water (annulus)	Removal Multipier		otal Gallons be Removed			l Gallons moved
MEASUREMENTS Well Purging Time /053	Conduct. 2.18 2.52 2.69	Temp. 17.8°C 18.9°C 17.9°C	Free CL ⁻ ON No No		issolved Oxygen	Well V well 2" 0.17gal/ft 4" 0.66gal/ft	An dia 6.5 7.25 7.75 8.25 8.25 10.25	Nulus * V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft 0.64gal/ft 1.06gal/ft
Post Sampling						6" 1.5gal/ft	12.25 12.25	1.63gal/ft 1.41gal/ft
SAMPLING Decontamination Procedures Used Sample ID MW-03	Volume (ml) 40 ml 1 onuo	Detergent Wash Solvent Rinse Filtered (Y/N) No		ion 142 2N>12 2N>9	Co	etergent Wa ater Rinse ontainer (Gims (3) (1)	3.1 	Other p.s. 420 R 23 B 23 B 23 B 23 B 23
Notes (include data on flo	oaters/sinke FO LOW V	ers with meas	uring device	e, well	condition	AMS A	NSS	70~Y 350

Anthord Little

Arthur D Little	Mon	itoring W Data	Vell Sampl Sheet	ling	Project Am	MW - 04 6/USATNAMA 71-WATERTOWN 1453 - 50
Evacuation Method PUMP (SUBMERSIS Sampling Method BASLER Sampling Personnel 5. Fo		Equipment U	- 12-90 Jsed (Calibrate W/Temp/Cano PID (ppm)		LOC Smoke STACK	CATION N
WELL VOLUME (* us V well -66 ANNULAR VOLUME	Depth S	Screen Bottom	Depth Water		illons of Water (well)	
V annulus	Depth S	Screen Bottom	Depth Bottom of Seal 28.05	Ga])]=	llons of Water (annulus)	·
WATER TO BE REMO Gallons of Wate (well) [(#	er Galle	ons of Water annulus)	Removal Multipier x	Total Gallo be Remo	ved	Actual Gallons Removed
MEASUREMENTS Well Purging Time pH /038 6.87 /048 7.//	Conduct. 0.27 0,21	Temp. /9.2°C	Free CL- ON No	Dissolved Oxygen	Well V well 2" 0.17gal/ft	Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft
7.30 7.32 Post Sampling	0.20	25.0°C 24.9°C		~	4" 0.66gal/ft 6" 1.5gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures U Solvent Used	sed	Detergent Wash Solvent Rinse, Filtered			Detergent Wa Water Rinse	sh Other 3, D.I. H ₂ O RINSE
Sample ID Analysis MW-04 7CL+30 YoL MW-04 7CL+30 SEME MW-04 CYMNEDE MW-04 SULFEDE	(ml) 40 ml 10 ml(on) 1 L	(Y/N)	Preservation Ice, NCI, No. Ice, NaDN, N Ice, NaDN, N	2 And " "12 Poly "9 "	Container ************************************	Time () 1802 1802 1802
	12	Yes	Ice, NNO, ph	12 11	/)	1802
Notes (include data on flo Purseo mw-03 w/ 8 SAMPLED TOMORRO	PASLER S	IMULTANEC	OUSLY. THES	WELL	WELL 80	E DUPISCATE

Arthur D Little Evacuation Method Pump (Susmerss		Data S	Vell Samp Sheet 3 - 90	ling	Well No. A Client 6 40 Project Am Case No. 4	/USATA 072-Na 01453 CATION	YAMA TERTOWN
Sampling Method BASLER Sampling Personnel 5. Fo.	RINER		Jsed (Calibrat PID (ppm)		000	0	THEP BANK K
WELL VOLUME (* us V well	Depth S	te values in t		code letter	Gallons of Water (well)]	- WHOOM
V annulus 1.06 WATER TO BE REMO	Depth S x [(/8	C 30% POR creen Bottom C. 39 ons of Water	OSITY) Depth Bottom of Sea 8.63 Removal				Gallons
[(Well) [(6.9) MEASUREMENTS		o. 3)]	x S =	83.5	Well	Ann	ulus *
Well Purging Time pH /200 5.24 /223 Veu Ra		Temp. 9.8 C	Free CL- WN No FCWANGE	Dissolved Oxygen		6.5 7.25 7.75	V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft
1240 5.58	0.39 V DRY, E	<u>8.9°C</u> H <u>O PUMP</u>	<u>NO</u> ENG	-	4" 0.66gal/ft	10.25	0.64gal/ft 1.06gal/ft 1.63gal/ft
SAMPLING			TV . D		1.5gal/ft		1.41gal/ft
Sample ID MW-05 MW-05	Volume (ml) Yoml /GARION /L /L /L oaters/sinke		Preservation Ict, NCI, N. Ict Ict, NoON p. Ict, NaON p.	12 Res 11 Post 179 11 Post 17	Container Container	3x D	Other 1. N ₂ O vs & Time 735 735 735 735

Arthur D Little	Mon	itoring W Data S		oling	Client E600 Project Am	MW-06 6 /USATHAMA 176-NATERIOWN 61453-50
c.mi	RTNER PRTEL	Equipment U HNa-PSD, ph Initial Well 1	PID (ppm)	0. <i>merens</i> 0. bppm	SUNKERS LOC SUNKERS LOC KHEMMER W PROJECT OF TO TO SUNKERS LOC TO SUNKERS LOC TO SUNKERS LOC TO SUNKERS LOC TO SUNKERS LOC TO SUNKERS OF TO TO SUN	
WELL VOLUME (* us V well 0.66 ANNULAR VOLUME	Depth x [(ASSUM)	Screen Bottom <u>'5./7</u> - E 30% POR	Depth Water)]=	allons of Water (well) 5.5 Callons of Water]
V annulus /.06 WATER TO BE REMO Gallons of Wat	x [(Z	Screen Bottom 5./7 - ons of Water	Bottom of Se	Total Gal		Actual Gallons
(well) [(5.5		(annulus) (B. 8)	X S	= 7 /.5		Removed 75 Annulus *
MEASUREMENTS Well Purging Time pH /334 5.94 /357 5.26	Conduct. 2.17 2.48	Temp. /0.9°C //.8°C	Free CL ON	Dissolved Oxygen	Vwell	dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft
Post Sampling	2.45	<u>//./ °C</u>			4" 0.66gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures Used Sample ID MW-06 MG-1815	Volume (ml) 40 ml / GMIION / L / L	Detergent Wash Solvent Rinse, Filtered (Y/N) No No		N > 12 Por N > 17 Por N > 19 "	Detergent W Water Rinse Container GENGLASS (3 " ()	ash Other 3. P.I. H.20 RINSE Time /454 /454
Notes (include data on fle	oaters/sink	· · · · · ·	uring device,	,	tion, etc.)	2

Λrtlur D Little	Mon	itoring W Data S	ell Sampli Sheet	ng C	lient <i>Æ646</i> roject <i>Ami</i>	MW-07 6/USATNAMA 7L-WATERTOWN 61453-50
Evacuation Method Sump (Summers) Sampling Method	(LE)	Equipment U	9 - 90 Sed (Calibrated	ØN)	LOC Tro-um	ATION 7 PLAY GROUND
Sampling Personnel J. For P. Con WELL VOLUME (* us	IN	Initial Well I	0.0	ppm 1/	ocardes house 2	
V well 0.66	Depth :	Screen Bottom	Depth Water	Gallo	ons of Water (well)	
V annulus	Depth :	E 30% POR Screen Bottom 36.87 -	OSITY) Depth Bottom of Seal 29.17	(;	ons of Water annulus)	
WATER TO BE REMO Gallons of Wa (well) [(5.08	ter Gall	ons of Water (annulus) B./6)]	Removal Multipier x	Total Gallons be Remove	d	Actual Gallons Removed
MEASUREMENTS					Well	Annulus *
Well Purging Time pH /540 6	Conduct. 0.22 0.24	Temp	Free CL ⁻	Dissolved Oxygen	V well 2" 0.17gal/ft	dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft
7555 6 7 7 Post Sampling	0.30	15° C	No No	-	4" 0.66gal/ft	8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.63gal/ft
					6" 1.5gal/ft	12.25 1.41gal/ft
SAMPLING Decontamination Procedures I Solvent Used Sample ID Analysis 701-30 Vol. 101-30 Semis	Volume (ml)			Co Amasa	etergent Wa ater Rinse ontainer (61-055 (3)	3x D.I. H ₂ O Riws & Time
MW-07 CYANIOE MW-07 SULFIOR	12	No	ICC NACHAN? ICC NACHAN? + ZWACCTATE	2 "	HYLEHE "	1700
MW-07 METALS	12	125	Zce, HNO, PV		"	1700
Notes (include data on fl	oaters/sink	ers with measu	aring device, we	ell condition	ı, etc.)	
Sigature			Date 2.9-9 0	No. 0	f Bottles _	7

Arthur D Little	Mon	Data	Vell Sampl Sheet	ing	Client 26-0 Project An	MN-08 USATHAMA 171-Natharow 1453-50
	etner IRTEL	Equipment U	0.0	METERS	100 3 3 37	CATION N
WELL VOLUME (* us V well 0.66 ANNULAR VOLUME	Depth S	Screen Bottom	Depth Water		lons of Water (well)	
V annulus 1.06 WATER TO BE REMO Gallons of Wat (well) [(5	x [(4	ons of Water	Depth Bottom of Seal 32.5/ Removal Multipier x 5 =			Actual Gallons Removed
MEASUREMENTS Well Purging Time pH 0909 6.77 09/6 6.44 0930 6.5/ 0937 6.43 Post Sampling	Conduct. 0.77 0.27 0.42 0.85	Temp. /3.6°C /4.6°C /3.3°C /5.6°C	Free CL ⁻ ON No No	Dissolved Oxygen	Well 2" 0.17gal/ft 4" 0.66gal/ft 6" 1.5gal/ft	Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.79gal/ft 8.25 0.64gal/ft 10.25 1.06gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures Used Solvent Used Sample ID MW-08 MW-08	Volume (ml) 40 ml /GMMON /L /L	Detergent Wash Solvent Rinse, Filtered (Y/N) No No No No	Preservation Ice NCI pN = 2 Ice NON pN Ice NON pN Ice NON pN Ice NON pN	2 Amst Amst 20 Posyt 29 "	Detergent Wa Water Rinse Container AGLASS (3 ENGLASS (1	3: D.I. H ₂ O REASE Time 1920
Notes (include data on flo	oaters/sinke	/	uring device, w		on, etc.) of Bottles	7_

Λrthur D Little	Mon	itoring V Data	oling		L-WATHAMA	
Evacuation Method Pump (Susmers18) Sampling Method Batter	ee)	Equipment (- B - 90 Jsed (Calibra		ARSENAL ST.	
Sampling Personnel A. For	VA/	Initial Well	PID (ppm)	0.6 ppm	246	PARKING LOT
WELL VOLUME (* us V well 0.66 ANNULAR VOLUME	Depth S	Screen Bottom	Depth Water	G	allons of Water (well) 3.58	
V annulus	Depth :	Screen Bottom 7./2 -	Depth Bottom of Sec.	al	allons of Water (annulus)	
WATER TO BE REMO Gallons of War (well)	ter Gall	ons of Water annulus)	Removal Multipier	Total Gallobe Remo	ved	Actual Gallons Removed
					Well	.Annulus *
MEASUREMENTS					V well	dia V annalı
Well Purging Time pH 17.25 6	Conduct. 0.40	Temp	Free CL	Dissolved Oxygen	2" 0.17gal/ft	6.5 7.25 0.46gal/ 7.25 0.59gal/ 8.25 0.79gal/
1830 6 2830 6	0.52	/3	No	-	4" 0.66gal/ft	8.25 0.64gal/ 10.25 1.06gal/ 12.25 1.63gal/
Post Sampling					6" 1.5gal/ft	12.25 1.41gal/
SAMPLING Decontamination Procedures Used Solvent Used Sample ID MW-/0 MW-/0	Volume (ml)	Detergent Wasl Solvent Rinse Filtered (Y/N)	Preservation Ice 1	412 Ama 11 04712 Post 0479 ''	Detergent Water Rinse Container (1)	3x D.I.H ₂ O REWSE Time
Notes (include data on fl WATER IS RUSTY. W RECOVERY, BEGAN PURE Sigature	ATER RE	GAN CLEAR	11NG 173	3 WELL 1 RY 2 183	RAN DRY	ALLOWED

Λrthur D Little	Mon	itoring W Data	_	oling	C Pi	ell No. / lient /6 /6 roject // ase No. /	145A	NAMA
Evacuation Method Pump (Submers Sampling Method	3816)		13-90	tod(V)NI)	4//		ATION	
Sampling Personnel T.A.	ORTHER TARTEL	Equipment U HN6-P80 PA Initial Well I	PID (nam)		_6		XXXX	J@c-3
WELL VOLUME (* us V well		ate values in t	able for each Depth Water		Gallo	ns of Water (well)		
ANNULAR VOLUME	L C	. 4.86 - E 30% POR	4.29 OSITY)]]=[7.0		
V annulus	Depth :	Screen Bottom	Depth Bottom of Se		(a	ns of Water ennulus) 1.2		
WATER TO BE REMO Gallons of War (well)	ter Gall	ons of Water (annulus) //. 2	Removal Multipier x 5 =	Total G be Re	moved			l Gallons noved
MEASUREMENTS Well Purging Time pH /530 5, 4/ /6/2 5.45	Conduct. (.05	Temp. 9.9 °C /2.6 °C	Free CL ⁻ ON No	Dissolv Oxyge		Well V well 2" 0.17gal/ft	An dia 6.5 7.25 7.75 8.25	V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft
Post Sampling						4" 0.66gal/ft 6" 1.5gal/ft	8.25 10.25 12.25	0
SAMPLING Decontamination Procedures U Solvent Used	Jsed Volume	Detergent Wash Solvent Rinse, Filtered				etergent Wa ater Rinse	3x D.	Other Z. H ₂ O
Sample ID Analysis TC1+30 You MW - 11 TC1+30 You MW - 11 CYANTO6 MW - 11 SULFEOE	40ml	(Y/N)	Preservation Jose, ACI pN Jose Jose, AGON, p Jose, AGON, p Jose, AGON, p Zuraner	N7/2 Poi N7/9 "	rged	ontainer 6ewss (3) " (1) EYCENE "		Time 735 735 735 735 735
Notes (include data on fl			_		lition	ı, etc.)		735
@ 1615 WELL RAN	DRY, ENC	PUR61		a				
Sigature Antiform	D. Little		Date <u>2-/3</u>	<u>-90</u> N	No. 0	f Bottles _	7	_

Arthur D Little	Mon	itoring W Data S	ling	Well No. / Client 6+6 Project am. Case No. /	/USATA 12-Na:	HADA FATOWN	
Evacuation Method Pump (Submers) Sampling Method BASLER	.BLE)	Equipment U	12-90 Jsed (Calibrate 1/1sme/Cono.			ATION	√ ↑ ~
Sampling Personnel J. Fo	PRIEL	Initial Well 1	PID (ppm) o	.5ppm		0-2	
WELL VOLUME (* us V well 0.66 ANNULAR VOLUME	Depth :	Screen Bottom	Depth Water		dlons of Water (well)		
V annulus	Depth :	Screen Bottom	Depth Bottom of Seal 31.69	Ga])]= □	llons of Water (annulus)		
WATER TO BE REMO Gallons of Wat (well)	ter Gall	ons of Water (annulus)	Removal Multipier x	Total Gallo be Remo	ved		Gallons loved
MEASUREMENTS Well Purging Time /425 6.32 /433 6.07 /442 /455 6.18 6.25	Conduct. 0.43 0.33 0.32 0.32	Temp	Free CL ON No No No No	Dissolved Oxygen	Well V well 2" 0.17gal/ft	dia 6.5 7.25 7.75 8.25 8.25	V annalus 0.46gal/ft 0.59gal/ft 0.69gal/ft 0.79gal/ft 0.64gal/ft 1.06gal/ft
Post Sampling					- 0.66gal/ft 6" 1.5gal/ft	12.25	1.63gal/ft 1.41gal/ft
SAMPLING Decontamination Procedures U Solvent Used Sample ID Analysis	Volume (ml)	Detergent Wash Solvent Rinse, Filtered (Y/N)			Detergent Wa Water Rinse Container	3× 0.1	Other L. N.O WSE Time
MW-12 7(1+3056m2 MW-12 CYANSDE MW-12 Sucfeet	I de la	No No No	Ico Ico, Nadnon Ico, Nadnon + Englesa:	1712 Poet	" (1) FINYLEMB "	2	000
Notes (include data on flo	oaters/sinke	ers with measu	ICC, HNOSPE	ye2 "	on, etc.)		000
Sigature	J. Zor	£	Date <u>2-/2-</u>	90 No.	of Bottles	7	_

Arthur D Little	Mon	itoring W Data S	-	ling	Project Am	MW-13 /USATHAMA 7L-WOTEATOWN 61453-50
Evacuation Method pump (Submersz	BLE)		9-90			ATION N
Sampling Method BASILER Sampling Personnel 3.50	RINER		Jsed (Calibrat PAPER, Como ME PID (ppm)	1. THERM.	1	mw-13////// 16 * 311
WELL VOLUME (* us						
V well		Screen Bottom	Depth Water		llons of Water (well) 5.89	
ANNULAR VOLUME V annulus 1.06	Depth x [(2	E 30% POR Screen Bottom 0.6# -	OSITY) Depth Bottom of Sea	1	llons of Water (annulus)	
WATER TO BE REMO Gallons of War (well)	ter Gall	ons of Water (annulus) 9.45)]	Removal Multipier x 5 =	Total Gallo be Remo		Actual Gallons Removed
MEASUREMENTS Well Purging Time pH 0845 5.5 090/ 5.5 09/0 6	Conduct. 0.28 2.08 3.12 3.05	Temp. 12.5°C 13.5°C 14.0°C	Free CL ⁻ ON No No	Dissolved Oxygen	Well V well 2" 0.17gal/ft	Annulus * dia V annalus 6.5 0.46gal/ft 7.25 0.59gal/ft 7.75 0.69gal/ft 8.25 0.64gal/ft
Post Sampling					- 4" 0.66gal/ft - 6" 1.5gal/ft	10.25 1.06gal/ft 12.25 1.63gal/ft 12.25 1.41gal/ft
SAMPLING Decontamination Procedures Used	Jsed Volume	Detergent Wash Solvent Rinse, Filtered			Detergent Wa Water Rinse	ash Other 3× d.I. H ₂ O Rewse
Sample ID	40ml	No No No No	Preservation Ice, NCI place LCE, NaON po ICE, NAON po + ZNACE	12 Amese 11- 11-12 Poly 11-19 "	Container (4 Ge#55 (3) (1) (1) (1)	Time 1120 1120 1120
Notes (include data on fl				well conditi		
WATER WAS ENETER	ILLY CLOS	UDY BUT	CLEARED U	P DURS	~G PURG	5 ~6.
Sigature	J. 7		Date _2-9-9	90 No.	of Bottles _	7

Arthur D Little	Mon	itoring W Data S		pling	Well No. MW-14 Client E6 16 / USATNAMA Project AMT1- Warearow Case No. 61453-50				
Evacuation Method Pump (Susmer	5E BLE)		7-90			CATION			
Sampling Method		Equipment U			17/1///////////////////////////////////	hp//3/			
BASLER Sampling Personnel J. For	2016	HNW-PED, PH		10 MEI., THER	BLO	6. # 31	/		
P. Co.		Initial Well I	AD (ppm)	O. Bppm	mw-jy	11171	1111111:		
WELL VOLUME (* us		ate values in t	able for eac	h code letter					
V well 0.66	Depth	Screen Bottom	Depth Wat	erG	allons of Water (well) 5.82				
ANNULAR VOLUME	(ASSUM	E 30% POR	OSITY)						
V annulus 1.06		Screen Bottom	Depth Bottom of S	Seal	allons of Water (annulus) 9.35				
WATER TO BE REMO Gallons of Wat (well)	ter Gall	ons of Water (annulus)	Removal Multipier	Total Gal			l Gallons moved		
				-	Well	,——	nulus *		
MEASUREMENTS					Vwell	dia	V annalus		
Well Purging			Free CL	Dissolved		6.5	0.46gal/ft		
Time pH	Conduct.	Temp.	ØN,	Oxygen	2"	7.25	0.59gal/ft		
1040 6	0.58	150	No		0.17gal/ft	7.75	0.69gal/ft		
1059 6	0.67	17°C	No		_	8.25	0.79gal/ft		
1345 6	0,64	21.0°C	No		4" 0.66gal/ft	8.25 10.25 12.25	0.64gal/ft 1.06gal/ft 1.63gal/ft		
Post Sampling					6" 1.5gal/ft	-	1.41gal/ft		
SAMPLING Decontamination Procedures Used Solvent Used Sample ID MW-14 TC1-3056M3 MW-14 TC1-3056M3 MW-14 Surfeds Notes (include data on fluiding was cloudy Raw dry, But Public Ray dry, But Public R	Volume (ml) /GRUON // // // // // oaters/sink // // // // // // // // // // // // //	YES ers with measurement to the second seco	Preservat Ice, HClp Ice, Hall Ice, Hall Ice, Hall Ice, Hall Ice, NNO2	ion N 2 Am N N 7 12 Pos N N 7 12 Pos N N 7 12 Pos N N N N N N N N N N N N N N N N N N N	Detergent Water Rinse Container GRAGEMSS (3) VETMYCEMS " " tion, etc.)	3× 0.2 R)	Time 1450 1450 1450 1450 1450		

Arthur D Little			oil Sample Log	Client EG+G Telaho Project AMTL- MATERIAN Case No. 61453 Date February 1910
Sampling N	Method HAIL AU	Equi	pment Used	LOCATION
Geologist(s		57	Amlese steel BARREL-TYP Augerz (3°)	ન .
500	Troter		AUGRIZ (3%)	
Comments	· FIRST SAMPLE • SAMPLE COMPOSE • SAMPLE COMPOSE	es freum All Lysic sites foir s	oper brienel for volatile emivols, 1985, Metals, Cyanide	
Sample Number	Auger Hole ID	Total Organics (ppm)	GEOLOGIC DES Unified Soil Class ID, color (I sorting, moisture, compaction (unusual odor or sheen), and gen	Munsell System), grain size, , indication of contaminants
0150601 0150001 Dep	Olsolo1 DISOLO DONICA	Te	Organic Rich SILTY SAM Febbles Cop To 1" diam), a	olor 54R2/2
0250601	0250601		METAL shop floor classess wood, city grime - & RASIL	Michaeling METAL FILINGS ARTHE CERAMIC BUTTERS FLANS
C3 solo1	0350401		DARK BROWN (5 YR 2/2) & STONE FILL 1-4" BLACK OF 4-6" - NO COOF REFINATE ThiCK CRYANICLARKS MATT T	
06:56601	0650201		SAND WITH 5% ACHORES UP	6" OLLIE SIERY MANGILY
6650bor	0650601		BROWN (5 YR 2/2) URJANIC AIC GRAY/HIDWN / WHAK SANDY MATEO 12 " (5 W), ABUMNANT PENGES	I spirity TOP SOIL TO P"
ouschell buplicate	OESUBOI DUPLICATE		"DAME AS Above	u
6950L01	5980L01		30-40%, PEUNE TIL MATERIA WITH CLIVE GIAN TO TAN SANDIS ON LEAKS FROM TRANSTORY	AL AROXIMAL TO TRANSFORMER RAVEL MATTEIX, HISTORY OF CIE
0930LOQ	०१८०८०२		30-401 pendos with conce TISANS FORMER, GERNEL/SAND I 6548-414-5483/AD, AL MINIC	DETE DELDIES - FILL HOUNDS
(25cher	1256hoi		0-6" SPAIRMY ORGANIC WICH . MATRIME, 6-15" FOORLY GRADED . TO 104R W PRONEY GRADED	dark brown (5 yr 2,4) PRAVELLAND (CA) 5 yr 4/4 -ARACL 16, 8811
1350la	13 Solo1		THE TO CLIVE CHOWN (5 Y 4/4) FROM 3-6" (GP), CHEYANIC R SIZN OF CONTAMINATION	poorly graped GNVD/gravel yell top for 0-3" - No
14 schol	14 subo1		United poorly graved grave SURFACE TO ME"-dark DEDWIN METALIC OSSIECTS INCL. MAILS	(5 ye 2/2) - exibided
Mouhaa	14 suboa		1-6" febbly strily soil, 6- (ef) w/ 10-15/ febbles 5 y Present Oxidized lead from	TO AN TO SYR J/Q, I STAMM
1500le1	15 62 01		6-29 CHUE TANGANULLY SAND W ADDADANT COAL & DIOLK DESILE) 0-3" by Annie pernos YUNCOMbosted Cont (2015) IS 26" No edoles
(3 sol 42	75 DEC 334		freely graded prayer samp and it now people, dank bu	(Ot) with Locick THAN EVENTY

Soil Sample Log Continuation Page

Client EG+ G Idaho
Project AHTL- UNTERTION
Case No. 61453
Date FERMARY. 1990

	Date February 1		Date February 1990	
Sample Number	Auger Hole ID	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size,	
1750ho1	1750bc1		DK. DIEDEM (SYRA/4) ORGANIC AND CLAY RICH TOP SOIL TO 6"3 6-12" APADES FROM CLARK DEDWN TO CLUBE GRAY (GM) POURLY GRADED FILTY SAND W/ MINDR UNCOMBUSTED COAL	
1750h 03.	17 50b ca		1-6" poorly sorted gravelly samb with high organic CONTENT, 6-12" gray-TAM ACORY GRADED SANDY GRAVEL WITH UNCOMBUSTED COAL, 12-12" PODRLY-PRACED BLACK/GROWFAMILE	
17 sub 03	17 dub 03		1-4" DARK GROWN CEMPTIC RICH TOP SUIL; 4-16" UNITERN	
175cl oi	17 Sol 01		POINT ~ 50" FROM PINERS COLDE. ORGANIK RICH MATT O-2" (5 YR 3/2) WITH INDEMNIC FINE SAND /SILT MIXTURE (ML) (5 Y 4/4) WITH SLIGHT PHOTICITY FROM 2-6", CONNESS OF TO 3-4" DIAMETER 1-3" CARCH BROWN SANDY, PENELY COMM WITH high CRYANIC CONTROL 7-6", MANNING OF TO 3-4" DIAMETER	
1750La2	17 sil 02		1-3" DARCH BEOWN SANLY, PEBELY COAM WITH high ORGANIC CONTENT, 3-6" MEDIUM GR. WELL PRADED SAND (50) WITH 27 PEBBLES (5 YR 302) - NO CONTAMINATION	

Date	2-15-90
	EG+G /USATHAMA
Projec	AMIL-WATERTOWN
Case N	0 61463-60

	Case No. 6/453-50					
TANK / SUMP DESCRIPTION						
Sampling Access Description Deen LED of CISIERN, HO LEVEL @ TOP, DIPPED CONTREMER						
Leak Detection / Monitoring Present (Describe) None	a contract of the second of th					
Tank) Sump Dimensions (LxWxH) 30'x 50' x 10' amos Total Volume *15,000 f	<u>'é.²</u> % Full <u>100 %</u>					
Tank Sump Status: Active Inactive Date Installed	d Age					
Type Of Construction						
Content History Contraga Reactor Coulds WATER						
HEALTH and SAFETY MONITORING,						
Equipment Used (Calibrated Y/N) None Chemzcal Radiantion PA	autense Gloves					
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sampling	Time Reading					
SAMPLING PROCEDURE						
Equipment Used (Calibrated Y/N) CHEMICAN ROSESTANT 6	LOVES. No EQUIPMENT					
Decontamination Procedures Used						
Detergent Wash Solvent Rinse Detergent Wa	sh Other					
Water Rinse Water Rinse Water Rinse						
Water Rinse						
Solvent Used						
SAMPLING						
VOLUME FILTERED	<i>analyses</i> Other time					
	RAO SAMPLE 1515					
+ Ice						
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling local	tions, discharge / fill points)					
	-,					
BLOG. REACTOR						
*97 \///\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
DOOR OF REACTOR						
DOESTLAN						
ROPO						
11/1/1/1/1/1///						
4111/1/////////////////////////////////						
Signature Date 2-15-90 No. Of	f Bottles/					
	Page/_ of/_					

Date	2-15.90
Client	EG+G/USATHAMA
	tAMIL - WAIERTOWN
	NO 111-2

	Case No. 61453-50						
TANK / SUMP DESCRIPTION							
Sampling Access Description Remove RECTANGULAR STORM SEWER GRATE							
	ng Present (Describe) Nos Assiscasio (N.A.)						
	LxWxH) See MAP Total Volume N.A. % Full Secont From						
	ve Inactive Date Installed Age						
	BRICK AND CONCRESE						
	M SEWER (SURFACE RUNOFF).						
HEALTH and SAFETY							
Equipment Used (Calibrat	ed Y/N)None						
	Time Reading Time Reading						
Air Quality Readings I	Pre-Sampling During Sampling						
]	During Sampling						
}	Ouring Sampling						
SAMPLING PROCED							
	ed YN / DIPPER W/ CHEMICAL RESISTANT GLOVES						
Decontamination Procedu							
Detergent Wash Water Rinse	Solvent Rinse Water Rinse Detergent Wash Water Rinse Other						
Solvent Rinse	DEDICATED DIP						
Water Rinse	cup						
Solvent Used							
SAMPLING	VOLUME FILTERED ANALYS 65						
SAMPLE METHOD	VOLUME FILTERED ANALYSES (ml) (Y/N) PRESERV. OTHER TIME						
OISEDOL MESSERAPE	40 ml (x3) No 106 TCL+30 Vol. 1555						
11 11 11	12 No ICE TCL.30 SEMBIPEB 1555						
11 11 11 11 11	500 ml do Ich Craneve 1555 500 ml do Ich Merastrum. 1555						
I OCATION DIA CDA							
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)							
ARSENAL ST.							
1///6/							
M THE DEPONITER							
SH DIEP II E BASE OF							
246	Sump.						
0156001							
* 1111111111111111111111111111111111111							
Signature	Date 2-15-90 No. Of Bottles 6						
1	Page _ / _ of _ /						

Λrtlur D Little

	Date 2-15-90
	Client E6+6/usninama
	Project MMTL-WATERTOWN
ı	Casa Na

	Data Sneet	Case No 14457 TO				
manus / GUIAN DEGG		Case No. 61453-50				
TANK / SUMP DESCI	RIPTION _{ON REMOVE ROUNDED STORM SEWER GRA}	are				
Tank Sump Dimensions	ng Present (Describe) Nos Applecable (N.A.) (LxWxH) <u>See Map</u> Total Volume (N.A.)	% Full STANDING				
Tank (Sump Status: Acti	ve Inactive Date Installed	% ruii <u>~~~~~</u>				
	BRICK AND CONCRETE					
• •	RM SCHER SURFACE RUN-OFF					
HEALTH and SAFET						
Equipment Used (Calibrat	4 .					
Equipment Osed (Canbra	Time Reading	Time Reading				
Air Quality Readings	Pre-Sampling	Treating !				
	During Sampling					
	During Sampling					
1 10 10 10	Post-Sampling					
SAMPLING PROCED	URE					
	ted Y/N) Usio A DIPPER SCRAPPER BUC	KET AND CHEM. RESSSIANT				
Decontamination Procedu	res Used	1 704				
Detergent Wash Water Rinse	Solvent Rinse Detergent Water Rinse Water Rinse	osh Other				
Solvent Rinse		DEDICATED				
Water Rinse		SCRAPE BUCKET				
Solvent Used						
SAMPLING	VOLUME FILTERED	Analyses				
SAMPLE METHOD	(ml) (Y/N) PRESERV.	TIME TIME				
095LGO/ DEP/SCRAPE		CL+30 VOL. 1635 CL+30 SEME, 1635				
		+ PCB 1635				
10 11 or 11		CYANIDE 1635				
,, 	500 ml No Ist	METALS /TEL 1635				
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)						
BLOG. # 43						
8286. 40						
14/1///						
09516013						
8104#3,3						
	The Data of the No. O.	f Pottles				
Signature Date 2/15/96 No. Of Bottles 6						
Page/_ of/						

Date .	2-15-90
Client &	S+G/USATHAMA
Project,	MTL-WATERTOWN
Casa No	

			Case No. 61453-50			
TANK / SUMP DESCRI						
Sampling Access Description	REMOVE CIRCL	ILAR GRASE (MAN	NO16).			
Leak Detection / Monitoring	Present (Describe)	for APPLICABLE ((V.A.)			
Tank Sump Dimensions (L	(WxH) SEE MAP	Total Volume	I.A. % Full SIMNUEAU WATER			
Tank Sump Status: Active	Inactive		alled Age			
Type Of Construction						
Content History Stoam	SAWER AND SUI	REACE RUN-OFF				
HEALTH and SAFETY	MONITORING					
Equipment Used (Calibrated	Y/N) Nos Appez	CABLE				
Du Du Du	ring Sampling		Time Reading			
SAMPLING PROCEDU	RE					
Equipment Used (Calibrated		KET AND CHEM. R.	ESESTANT GLOVES			
Decontamination Procedures						
Detergent Wash	Solvent Rinse					
Water Rinse Solvent Rinse	Water Rinse	Water R	tinse DEDICATED			
Water Rinse			BUCKET.			
Solvent Used						
SAMPLING	NOT THE STATE OF		4			
SAMPLE METHOD	VOLUME FILTE (ml) (Y/		ANALYSES TIME			
1254601 DEP/SCRAPE	40 ml (13) No	•	7CL+30 VOL 1615			
ii H ji U	Il No	Ict	TCL+30 SEMT, 1615			
- ti - ti - ti - ti -	250 ml No	Icé	+ PC8 CYANEDE 1615			
t1 11 (1 V)	500 ml No	Ict	METAIS/TCL 1615			
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)						
• SOTHER MANHOLES 8LOG. # 60						
1/ 1/8 /// N						
12511-01	→ <u>@</u> •	V/	\wedge			
Jumester.						
1//// LARGE OSL TANKS						
"////		X111/1/				
Signature .	6	Date 2/15/40 No	o. Of Bottles			

Tank and Sump Sampling Data Sheet

Date .	2-20-	90
Client &	+G /USAT	HAMA
Project /		
Cosa No		

				Case No.	61453-50		
TANK / SUMP DESCRIPTION ENTER THROUGH STORM CEUAR DOORS ON S.W. CORNER,							
Sampling Access Descripti	on FOLLOW ACCES	S WAY TO IST L	FT, CROSS PIPE	S, SUMP JUST !	45 YOU CROSS 92165.		
Leak Detection / Monitori	ng Present (Desc	ribe) Nor Ar	PLICABLE (N.	(A.)			
Tank / Sump Dimensions	(LxWxH) See /	MapTot	al Volume <i>Iu</i> .	ST SLUNGE % F	'ull <u>10 %</u>		
Tank / Sump Status: Acti	ve Inac	ctive	Date Ins	talled	Age		
Type Of Construction							
Content History Busio	ING #39 SUM	P.					
HEALTH and SAFET	Y MONITOR	ING					
Equipment Used (Calibrat	ted Y/N) Nor	APPLECABLE			***************************************		
Alm Ossalidas Danadissas	D C	Time	Reading	Time	Reading		
	Pre-Sampling During Sampling						
	During Sampling						
	During Sampling _ Post-Sampling						
SAMPLING PROCED							
Equipment Used (Calibrat		060 SUIGE A	I CLOVED WAN	ID AND GLASS	BERNER		
Decontamination Procedu			7 520120 11111	<i>yy</i>			
Detergent Wash		ent Rinse	Deterge	ent Wash	Other		
Water Rinse	└ ── Wat	ter Rinse	Water I		O.I. WATER		
Solvent Rinse Water Rinse					INSÉ		
Solvent Used							
SAMPLING	_						
SAMPLE METHOD	VOLUME (ml)	FILTERED (Y/N)	PRESERV.	AHALYSES	TIME		
0551602 GLASS BEAKER		do	Ice	101.30 Voc.	1530		
D 0 11 11 V	11	No	Ich	TC1+30 SLMZ .			
<i>H</i> 1/ 11 1/	250 ml	No	Ict	CIANZOE	1530		
n n n	500 ml	No	Ict	METRINICL	1530		
LOCATION DIAGRA	M and NOTES	(Indicate orie	entation, sampling	g locations, discha	rge / fill points)		
	-0551603	N	(₭	* 220	→ \		
0	1	1	\ -				
STORM DOORS	-	1	\ 0	* 0			
→E::®:::	055LGOI	PIPES)	OU HAVE R	3'			
BLDG. #39	BLDG. #39 TO CROSS. (NOT SAMPLED - DRY)						
				05 SLG 01			
	11		/ /				
Signature	fat	Date	2/20/90 N	o. Of Bottles _	6		
Page _ / of _ /							

Arthro Little

Date	2-20-90
Client	16+6/USATHAMA
Projec	t AMTL-WATERTOWN
Cara	T-

		Case No. 61453-50
TANK / SUMP DESC	RIPTION	
Sampling Access Descript	ion REMOVE ROUND SOUSO MANHOLE	
Leak Detection / Monitori	ing Present (Describe) Nor Applicable (A.A.	
Tank /Sump Dimensions	(LxWxH) 4 oran. 6 orep Total Volume M.A.	% Full 4"STAND. N, O
Tank / Sump Status: Acti		d Age
	BRICK AND CONCRETE	· ·
Content History Sum	P EAST STOL OF BUTLUENG \$243.	
HEALTH and SAFET		
Equipment Used (Calibra	ted Y/N) Nor Applicable	
	Time Reading	Time Reading
	Pre-Sampling	
	During Sampling	
	During Sampling	
	Post-Sampling	***
SAMPLING PROCED		
	ted Y/N) STATHLESS STEEL BALLER W/ DETRICATED ST	RENG + CHEM. RESEST. GIOVES
Decontamination Procedu		
Detergent Wash Water Rinse	Solvent Rinse Detergent Water Rinse Water Rinse	ash Other
Solvent Rinse	Water Kinse	3. D.I. WATER
Water Rinse		RENSE
Solvent Used		
SAMPLING	VOLUME ENGEDED	4.
SAMPLE METHOD		CHIER TIME
DIAQUOI BASLER	un 11 m	(1130 VOL. 1330
1) () (4))	1 GALLON NO ICE TO	101+30 SBMS. 1330
11 11 11 11	12 NO ICE, MADINAMA, 3	YANTOE 1330 SULFIDE 1330
	+ 2 ~ AUSTATE	
<u> </u>	1.6 YES JOE, HNOSPILL M	VIAIS/TCL 1330
LOCATION DIAGRA	M and NOTES (Indicate orientation, sampling local	tions discharge (CII - sints)
LOCATION DIAGRA	ARSCHAL STREET	nons, discharge / filt points)
N DYXXX	TATION CONTRACTOR TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TOTAL TO THE TOTAL T	1/11/11/11/11
1 0 mw-10	3	mw-13
	PARKING	
*246	LOT OIAQUOI MW44	BLOG. #311
	241 243	
1//////		
Signature Quel	Date 2/20/90 No. Of	f Bottles 7

Date 2-20-90/2-22-90
Client E6+G /USATHAMA
Project AMTL - NATERTOWN
Case No.

				Case No.	61453-50
TANK / SUMP DESC	RIPTION				
Sampling Access Descript	Sampling Access Description LONGRED BASIER THROUGH YENT STACK				
Leak Detection / Monitor	ing Present (Desci	ibe) Tanks ma	SHIAMED IN CO.	VERETE VALLE AS	2 MOANY CONT.
Tank Sump Dimensions	(LxWxH) 12 (50,71, 3)	O'LONG Tota	al Volume 10,00	09 ЕАСН % Fi	Ill & E % EACH
Tank Sump Status: Act			Date Insta		
Type Of Construction _	STEEL TANKS	EN CONCRETE	VALLET AS SEC	COMPARY COM	ASHMENT
Content History Compa	ENED FUEL O	EL.		<u>,, , , , , , , , , , , , , , , , , , ,</u>	
HEALTH and SAFET	Y MONITOR	NG			
Equipment Used (Calibra	ited Y/N) Nor	APPLICABLE			
Air Quality Readings	Pre-Sampling During Sampling During Sampling During Sampling	Time	Reading	Time	Reading
	Post-Sampling _				
SAMPLING PROCEI			,		,
Equipment Used (Calibra		LON BALLERS	EACH (LATIONAT	ONY CLEANED	PRE + POST SAMP)
Decontamination Procedu		nest Direct	D.A.	4 3Wh	Other
Detergent Was Water Rinse	***	ent Rinse er Rinse	Detergen Water Ri	inse 🛂	Other
Solvent Rinse					RINGE BEFORE
Water Rinse				APTE	
Solvent Used					
SAMPLING	VOLUME	FILTERED		ANALYSES	
SAMPLE METHOD	(ml)	(Y/N)	PRESERV.	OTHER.	TIME
OBOTLOZ I"BATLER	40 mel (x3)	No	106	766 = 30 VOL.	1600 2/20/10
-1 H H H	500 ml	No	Ich -	TCL+ 30 SEME,	
				SULFE DE	
				PESTECTUE	
030110/ I"BALLER	40 mml (=3)	No	Ice	SAME	1355 2/22/90
A) 21 21 21	500 ml	No	Ick	SAME	1355 2/22/90
LOCATION DIAGRA	M and NOTES	(Indicate orie	ntation campling	locations dischar	ge / fill_points)
	ENAL ST.	(Indicate of ic	ntation, sampling	iocations, dischar	ge / IIII points)
7/7/7/1////////////////////////////////	51012////03	05102	<u> </u>	<u>*</u>	
P O mis-on	BLDG. # 43		BLOG	# 43	y 000.R5

Date	220-90	_
Client	EGIG /USATHAMA	_
Project	AMTE - DATEATOWN	
	0. 61453-50	

			Case No. 61453-50
TANK / SUMP DESCI	RIPTION		
Sampling Access Descripti	on 2 - 2" HOLES DRILLED	(PREVEOUSLY) THR	OUGH LAB FLOOR
	ng Present (Describe) None		
	(LxWxH) <u>UNKNOWN</u> Tot		
Tank / Sump Status: Acti	ve Inactive	Date Installe	ed Age
	UNKHOWH		
Content History	OWN (CESTERN UNDER &	8406. #313c	
HEALTH and SAFET	Y MONITORING		
Equipment Used (Calibrat	ted Y/N) Nor APPLECABLE	E	
	Time	Reading	Time Reading
	Pre-Sampling During Sampling		
1	During Sampling		
	During SamplingPost-Sampling		
SAMPLING PROCED			
	ted Y/N) USED DEAM. TER	TON BATTLER, CHEM.	RESIST. GLOVES, DIDICHTED STREAM.
Decontamination Procedu			
Detergent Wash Water Rinse	Solvent Rinse Water Rinse	Detergent W Water Rinse	
Solvent Rinse	, and analy	,, and Itimo	3 x D. E. HIO RINSE
Water Rinse			
Solvent Used			
SAMPLING	VOLUME EN MEDED		
SAMPLE METHOD	VOLUME FILTERED (ml) (Y/N)	PRESERV.	ANALYSIS TIME
DANGUOI BASLER	40 mel (23) No		1415
11 11 11	I GALLOW NO	Ict.	1415 1415
11 11 11 11	1.l No		SULFEDE 1415
		Z HACETATE	
<u>"" " " " " " " " " " " " " " " " " " "</u>	12 425	ICE, HNO px 2	norms/rec 1415
LOCATION DIACDAE	M and NOTES (Indicate ori		4' 1'1 / 0"II ' (-)
LOCATION DIAGRA	VI and NOTES (indicate ori	entation, sampling loca	ations, discharge / fill points)
		1//	
N /	11/11/11/11	1//	SHELVE'S
1 11/11/12		-	1 1340 [5]
Ø \$1.06. //=			T SAMPLED
313		- 1//	MANKED NOLE FOR
		V/.	TAULE TO OPAGUOI
11/17/1/1/1/	1/////////	CISIEAN	00
Signature	1.1/_		
Signature	Date	2/20/90 No. O	of Bottles

Date	2-20-90
Client	EG+G /USATHAMA
Project	AMIL-WATERTOWN
	0 / 111 == ==

		Case No. 61453-50
Sampling Access Description		
Total Volume Methods % Full 4.26% Table Sump Dimensions (LAWAH) MARKED TO Total Volume Methods % Full 4.26% Table Sump Status: Active Inactive Date Installed ? Age ? Type of Construction 5.766 Lance or vent strates Content History (Latertale out?) Table 2.85 5106 of 3100. "37 HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) / Status 2.85 5106 of 3100. "37 HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) / Status 2.85 5106 of 3100. "37 SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) / Status 2.85 5106 of 3100. "37 Decontamination Procedures Used Water Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Solvent Used SAMPLING SAMPLI		
Total Volume Lineary We Full 287% Cank Sump Status: Active Inactive Inactive Sump Status: Active Inactive Profession Steel (2015) 100 Profess		
Type Of Construction Steel lange or vent strates Content History (steets of 2) Tank 0.855 2102 OF 3100. "37 HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N)		% Full < 25%
Content History (NEGITINE OIL ?) TANK BASS SLOPE ON BLOW. "39		1? Age _?
HEALTH and SAFETY MONITORING Equipment Used (Calibrated Y/N) Nor More Conseque Air Quality Readings Time Reading Time Reading During Sampling During Sampling During Sampling During Sampling During Sampling During Sampling Post-Sampling SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) Sam, Bariste Solvent Rise Detergent Wash Water Rinse Solvent Rise Water Rinse Solvent Rise Water Rinse Detergent Wash Water Rinse Solvent Rise Water Rinse Solvent Rise Detergent Wash Water Rinse Solvent Used SAMPLING SAMPLE METHOD Solvent Rise Solvent Used Sample Solvent Used Solvent Used Solvent Used Sample Solvent Used		
Equipment Used (Calibrated Y/N) Air Quality Readings	Content History (NEATING OIL?) THENK BAST SIDE OF BLDG. #39	
Air Quality Readings Description During Sampling Description De	HEALTH and SAFETY MONITORING	
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sampling During Sampling Post-Sampling Sampling During Sampling Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Rinse Solvent Rinse Solvent Rinse Water Rinse Solvent Rinse Solvent Rins	Equipment Used (Calibrated Y/N) Nor Applecage	
During Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sam		Time Reading
During Sampling During Sampling During Sampling Post-Sampling Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (m)	Air Quanty Keadings Pre-Sampling	
SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) / Stant, Basiste N/Stockard States, and Creen Assests. Georges. Decontamination Procedures Used Detergent Wash Water Rinse Water Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) SAMPLE METHOD (ml) (Y/N) PRESERV. STEER TIME CSOLID: Sizese Yound (1s) No. 1ce PRIJESSING PR	During Sampling	
SAMPLING PROCEDURE Equipment Used (Calibrated Y/N) / Seam, Basiste of processing states, and commanders of the processing states and commanders of the processing states. Decontamination Procedures Used Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Solvent Used Detergent Wash Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Water Rinse Detergent Wash Water Rinse Dete		27.144
Equipment Used (Calibrated Y/N) Solvent Rinse Solvent Rinse Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Water Rinse Solvent Rinse Water Rinse Solvent Wash Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. STIME SOLVENT SOLV		
Detergent Wash Water Rinse Solvent Rinse Water Rinse Solvent Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SOUND SOLVENT SOUND SOUND SOLVENT SOUND SOLVENT SOUND SOLVENT SOUND SOLVENT SOUND SOUND SOUND SOLVENT SOUND SOUND SOUND SOLVENT SOUND S		O CHEM ARCICS CINISC
Detergent Wash Water Rinse Solvent Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SOLVENT STACKS SOLVENT STACKS SOLVENT STACKS Detergent Wash Water Rinse Other Water Rinse Other Water Rinse Other Wash Water Rinse Other	· · · · · · · · · · · · · · · · · · ·	U LATTI NESLIST. GEOFFS,
Water Rinse Solvent Rinse Water Rinse Water Rinse Water Rinse Solvent Used SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SOCIAL SOCIA		sh Other
SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SHIFF TIME OSOLIO! BELLER 40 ml (1s) No Ice 12(130 Vo. 1500 """ SOOme No Ice 12(130 Vo. 1500 PELISO SEME 1500 Survey. Metals N BLDG. 39 VENT STREKS Date 2/20/90 No. Of Bottles 4	Water Rinse Water Rinse	
SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. STHER TIME OFOTION RESIDER 40 med (12) No fee 161 / 50 / 00 / 1500 """ SOOme No fee 161 / 00 / 00 / 00 / 00 / 00 / 00 / 00		3x D. J. HzO Kense
SAMPLING SAMPLE METHOD (ml) (Y/N) PRESERV. SHIFF TIME OSOLIO BELLER HOME (12) No Ice [1500 """ SOOM! No Ice [1500 CYANGE SOUND SOUND SOOM! No Ice [1500 PERSON PERS		
SAMPLE METHOD (ml) (Y/N) PRESERV. HIER TIME OSOILO BETLER 40 ms (1s) No Ice 10130 Vol 1500 """ SOOme No Ice 10130 Vol 1500 PCG/PEST, Crances, Sulvise, METHOS NO Ice 10130 Vol 1500 PCG/PEST, Crances, Sulvise, METHOS NO BLOG. 39 VENT STACKS 39 VENT STACKS 39 Date 2/20/90 No. Of Bottles 4/		
SAMPLE METHOD (ml) (y/N) PRESERV. TIME OSOTIO BETTER 40 ml (13) No Ice 10130 Vol 1500 """ Soome No Ice 10130 Vol 1500 PELISO SEME 1500		ANALYSES
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) Signature Date 2/20/90 No. Of Bottles 4	SAMPLE METHOD (ml) (Y/N) PRESERV.	TIME
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) Diagram Diagram		
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) N BLDG. 39 VENT STACKS BLDG. 39 Date 2/20/90 No. Of Bottles 4/		
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) N BLDG. 39 VEHI STRCKS BLDG. 39 VEHI STRCK 34 MAN STRCK 34 MAN STRCK 34 MAN STRCK 34 MOTES NO. Of Bottles 4		VANEOE,
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points) 8106 656 8106 656 8106 70 8106 70 9801 5780K 9801		
N BLDG. 39 VEHI STACKS BLDG. 39 VEHI STACK 39 VEHI STACK 39 OS OILO! Signature Date 2/20/90 No. Of Bottles 4/		
N BLDG. 39 VEHI STACKS BLDG. 39 VEHI STACK 39 VEHI STACK 39 Date 2/20/90 No. Of Bottles 4/		
N BLDG. 39 VENT STACKS BLDG. 39 VENT STACK 39 OSOILOI Signature Date 2/20/90 No. Of Bottles 4	LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locat	tions, discharge / fill points)
N BLDG. 39 VENT STACKS BLDG. 39 VENT STACK 39 OSOILOI Signature Date 2/20/90 No. Of Bottles 4	Commence Or and	
Signature Date 2/20/90 No. Of Bottles 4		[454]
BLDG. VENT STACK 39 VENT STACK 3AMPUED 05 0 I L 0 Signature Date 2/20/90 No. Of Bottles 4/	. 1/// 1	700
Signature	Vent STACKS BLOG.	
Signature	39	
Signature Date 2/20/90 No. Of Bottles 4		J
Page / of /	Signature Date $\frac{2/20/90}{2}$ No. Of	Bottles
		Page _ / _ of _ /

Tank and Sump Sampling Data Sheet

Date 2-22-90
Client £6-6 / USAIHAMA
Project PAIL-WATERTOWN
Case No. 61453-50

Substitute (1,473,35
TANK / SUMP DESCRIPTION
Sampling Access Description THROUGH DEDG. 226 VALUE DOORS + DOWN LADDER, MANHOLE OPEN@ OFFER OND
Leak Detection / Monitoring Present (Describe) BLOS. 226 25 CONCRETE (2"0 MY CONT.) AROUND 2 TANKS.
Tank Sump Dimensions (LxWxH) (2 * 10 CACH Total Volume 2-10,000 gac. % Full 8074 5 %
Tank Sump Status: Active Inactive _x Date Installed Age
Type Of Construction Value = Concress, Trans = Steel.
Content History VALLE HOUSES THE 2 TANKS, SLUDGE 035LGOI COLLECTED FROM VALLEFLOOR.
HEALTH and SAFETY MONITORING LEVEL ISAMPLER EN SCHA (30 MEN) AND FLASHER
Equipment Used (Calibrated (Y/N) 3 people: 18 Base of LADDER W/ SMEN. ESCAPE PACK + HNo-PSD.
Air Quality Readings Pre-Sampling During Sampling During Sampling During Sampling Post-Sampling Post-Sampling
SAMPLING PROCEDURE
Equipment Used (Calibrated Y/N) <u>5CBA (30 msr.)</u> FLASH LZGHT, CHEM RESZST. GLOVE, GLASS BEAKER
Decontamination Procedures Used
Detergent Wash Solvent Rinse Detergent Wash Other
Water Rinse Water Rinse Water Rinse Water Rinse Solvent Rinse
Water Rinse
Solvent Used
SAMPLING
VOLUME FILTERED AMALYSE'S SAMPLE METHOD (ml) (Y/N) PRESERV. CITIER TIME
0351401 GLASS BEAKER HOML (+2) No ICE 701+80 Vol. 1355
(SCRAPE FLOOR) 500 ml No ICE TO1-30 SEME, 7 1355
PCB/Pist,
- Suiffor -
LOCATION DIAGRAM and NOTES (Indicate orientation, sampling locations, discharge / fill points)
ARSENAL STREET
O ENDECATES
NEGE CONSTRUCTIONS WHECH OSSIGO
"
8106.226
BLOG. # 43
Signature Date 2/12/50 No. Of Bottles 3

Date	2-	22.	- 90)	
Client					_
Projec					
Caca	Jo				_

				Case No.	61453-50
TANK / SUMP DESC					
Sampling Access Descript	ion 2.0' OEEP [DKY) SUMP L	OCATED IN BASE	SMENT OF 8	106.36.
Leak Detection / Monitori	ing Present (Desc	ribe) Nor AA	PLECABLE		
Tank Sump Dimensions	(LxWxH) / 'x/'x	2'Tota	al Volume 2 cus	ze ft. % Fu	11 0%
Tank / Sump Status: Acti	ive Inac	ctive X	Date Install	led	Age
Type Of Construction				1160	
Content History Sum.	P BLOG. 36.				
HEALTH and SAFET	Y MONITOR	ING			
Equipment Used (Calibra	ted Y/N)	+ APPLICAB	1 de		
	During Sampling During Sampling	Time		Time	Reading
	Post-Sampling				
SAMPLING PROCED					
Equipment Used (Calibra		CAIED TEFLON	BEAKER, NOOD	EN SCOOP, L	AYTEY GLOVES
Decontamination Procedu	-	. 74			7
Detergent Wasl Water Rinse		ent Rinse ter Rinse	Detergent V Water Rins	se 🔼	Other
Solvent Rinse				3× D. 1	. HzO RINSÉ
Water Rinse					
Solvent Used					
SAMPLING	VOLUME	FILTERED		ANALYSES	
SAMPLE METHOD	(ml)	(Y/N)	PRESERV.	ETTIER	TIME
07AQUO) 5000P	40 mel (=3)	No		Tel+30 Voc.	1445
js 47 11 t ₁	12	No	<u>Ice</u>	TCI+30 SEMS, PCB/PEST	1445
10 11 11	250 ml	No	ICE	CYANIUE	1445
11 11 11	500 ml	No	Ich	METHUS (TC)	1445
LOCATION DIAGRA	M and NOTES	S (Indicate orie	ntation, sampling lo	cations, discharg	ge / fill points)
BECAUSE SUMP WAS	DRY EG+G REQU	ESTED THAT	A SEDEMENT SA	MPLE BE COL	4ECTED
ENSTEAD.	E (31895 TO 8A	SEMBAS)			
	四-	^			
7	4 6			1	
1 <i>-</i>	-1		<u>07AQUO</u> /		PUMP IN
•	1 1 202			PLACE.	Pump i~
	BLDG. 30	6			
Signature 2	12/-	Date	2/22/40 No.	Of Bottles	6
	, .,		100		

Date 2-	12/23 - 90
Client #6	+6/USATHAMA
Project A	MTL-WATERTOWN
Case No	111100 000

		Case No. 61453-50
TANK / SUMP DESCI	RIPTION	
	ON REMOVE STORM SEWER MANHOLE	
	ng Present (Describe) Nos Applecable	
	(LxWxH) SEE BELOW Total Volume	
	ve Inactive Date Instal	
	PRICK AND COMERKEE	
Content History Srok	AM SEWER SURFACE RUN-OFF	
HEALTH and SAFET	V MONITORING	
	ted Y/N) Nor APPLICABLE	
Equipment oscu (Canorai	Time Reading	Time Reading
	Pre-Sampling	Reading
	During Sampling	
	During Sampling	
	Post-Sampling	
SAMPLING PROCED	URE	
Equipment Used (Calibrat	ted Y/N) From surface using STABNIESS S.	TEEL DEPPER + CHEM. RESES.
Decontamination Procedu	res Used	GLOVES
Detergent Wash		
Water Rinse Solvent Rinse	Water Rinse Water Rins	se 3x D.I. waser
Water Rinse		REMSE
Solvent Used		
SAMPLING		
	VOLUME FILTERED	ANNESSES
SAMPLE METHOD 16AQUO/ 5.5.Dzpper	(ml) (Y/N) PRESERV. 40 ml (*3) No Ist M(2)	TIME TIME
IGAQUO/ 5.5.DSPPER	1 GALLON NO ICE, NC/pN-2	7C1 = 30 Voc 2143 (2/22/10)
2) 11 /1 11	11 NO 715/1004 pH>12	CYANSUE 1738
11 11 11 11 4	_/_ No	<u>Suiff08 1738 </u>
21 21 34 3+	12 No Ecc. MND 2 PH = 2	Mesous/101 1738
LOCATION DIAGRAM	M and NOTES (Indicate orientation, sampling lo	cations, discharge / fill points)
24 HOUR CLMPOSZIE O	P ALL SAMPLES EXCEPT VOAS.	A GE 24" DEAM.
130 OF//	A 1/1//1 TOTAL DEPTH	NEAR BOTTOM
N /	APPAOX. B'	B. 12" DE AM. NEXT TO A
	1640001 0-10	O:5" DIAMETER,
MW-06 0		3' FROM SURFACE
60-3-0		O = 8" DSAMEIE!
	BONLY PEPE NE	TH FLOW, 5' FROM SURFACE
'//////	GUARD HOUSE STRNUENG HOD SAMPLED.	IRESENT BUT
Signature		Of Bottles 7

Date	2-22/	23 - 9	70
Clien	E6+6/4	ISATH	nne
Proje	ct amsi -	Nore	LTONN
	No. 1-14		

				Case No.	1453-50
TANK / SUMP D	ESCRIPTION				
Sampling Access De	scription <u>Remove</u>	STORM SEWL	R MANHOLE		
Leak Detection / Mo	onitoring Present (Des	cribe) <i>Nor H</i>	PPLSCABLE		
Tank /Sump Dimen	nsions (LxWxH) Sec.	E BELOW Tota	l Volume	% Fı	6000 FLOW +
Tank Sump Status	: Active X Ina	ictive	Date Instal	lled	Age
	on Brick AND				
Content History	STORM SENER		TA 5444 - 4444 - 444		
HEALTH and SA	FETY MONITOR	RING			
Equipment Used (C	alibrated Y/N)	OF APPLICABL	uE.		
4! O !!! D !!	D C 11	Time	Reading	Time	Reading
Air Quality Reading	S Pre-Sampling During Sampling				
	During Sampling				
	During Sampling Post-Sampling				
CARRY INC. PR					
SAMPLING PRO					
	alibrated Y/N) <u>Fnom</u>	SURFACE USING	STAINLES STEE	L DEPPER + CHE	em. RESIST, GIOVES,
Decontamination Pr		land Division		K	7 0.1
Deterge Water I		lvent Rinse ater Rinse	Detergent Water Rin	se 🔽	Other
Solvent	Rinse			3× 2	D.I. HZORENSE
Water I	Rinse				
Solvent Used					
SAMPLING	VOLUME	FILTERED	**** **********************************	ANALYSES	
SAMPLE MET	THOD (ml)	(Y/N)	PRESERV.	GTHER.	TIME
	SAPER 40 ml (13)	do	ICE NCI AND	TC/+30 You.	2215 (2/22/30)
· · · · · · · · · · · · · · · · · · ·	" IGALION	No	Ice	701+30 SEME.	1804 (2/23/10)
11 11 n	1.6	No	Tet, NACH, Nº12		1804 (2/23/90) 1804 (2/23/90)
<i>y u u</i>			- ZnALETATE -		
	11.	No	ICE, HND, pH 12	METASS / TCI	1804 (2/23/90)
ITAQUO SAM	nt Same	SAMLE	SAME	Same	1824(2/23/90)
LOCATION DIA	GRAM and NOTE	S (Indicate orie	ntation, sampling lo	cations, dischar	ge / fill points)
ITAQUOI X		and the same	118	17AQUC	2
	(652) BDD			6000 FLOW, 2	YHOUR COMPOSITE)
SAMPLE, NO FLOW)	OF TO STATE OF THE		115411	@	8 = 24" DEAM.
H	CA TO STATE OF THE PARTY OF THE	(1)		46	5.0' FROM SURFACE
	3 + - E		ITAQUOZ	(~	B = 24" Usam
7	A REST	***************************************	1/6///		8.0' FROM
A= 12" DEAM . ?	1 - F	- 3/6/		8 8	Flow Collected
8 - 6" DEAM. SHO FLOW C = 12" DEAM.	**	= #	19///////		IROM Q.
Signature	fal. Lot	Date _	2/23/90 No.	Of Bottles _7	17=14
7			-	Pa	ge/_ of/_

Date 2- 22/23 - 90
Client EG + G /USATHAMA
Project AMTL - WATERTOWN
Case No. 6/453-50

				Case No.	61453-50
TANK / SUMP DESC	RIPTION				
Sampling Access Descripti	ion Remove	STORM SE	WER MANH	012	
Leak Detection / Monitori	ng Present (Descri	be)	APPLECABLE		FLOW T
Tank / Sump Dimensions	(LxWxH) See Be	Tota	ıl Volume	% Fu	Ill 510HD. 1120
Tank / Sump Status: Acti	ve X Inact	ive	Date Insta	lled	Age
Type Of Construction	BATCK AND COM	CREIT			
Content History 5 rox	m Sewen (pos	SSEBLY SEP.	TEC/SANSTARY	scuer)	
HEALTH and SAFET	Y MONITORII	NG			
Equipment Used (Calibra	ted Y/N) Nor	APPLICABLE			
Air Quality Readings	Pre-Sampling During Sampling During Sampling	Time	Reading	Time	Reading
	During Sampling				
	Post-Sampling				
SAMPLING PROCED	URE				
Equipment Used (Calibra	ted Y/N) <u>Faom sui</u>	AFACE, USENO	STACHIESS STEFL	DEPPER CHEM.	RESESS. GLOVES
Decontamination Procedu					
Detergent Wasl Water Rinse		nt Rinse r Rinse	Detergent Water Rir		Other
Solvent Rinse	Water	Kiuse	Water Kii	3× D.	I. HO RENSE
Water Rinse					
Solvent Used					
SAMPLING	VOLUME	FILTERED		ANALYSES	
SAMPLE METHOD	(ml)	(Y/N)	PRESERV.		TIME
1840403 5.5. DEPPER		No	Ice, WCIpH'2	761+30 You	2230 (4/22/90)
11 11 11 11	1.S	No	Ich NAON , NO 12	TC1+30 SEMI CYANIDE	1836 (2/23/90) 1836 (2/23/10)
49 19 31 +3	10	No	ICE, NAONDH >4,	SUFFER	1836 (2/25/90)
11 11 11 11	1.0	No	ICE NHO ONCZ	METALS/RI	1836 (2/23/40)
LOCATION DIAGRA	M and NOTES	(Indicate orie	ntation, sampling l	ocations, dischar	ge / fill points)
1/1 WILL REACH	roR)	# :THEF	IBAQU	103 @= 4"	PROF. 9.5' FROM
N 8106.		• = OTHER MANNE	ec 2,	C 1 Ø = 6"	DEMMETER
#97	1////	in William	6	W// / W	PKOK. 6.0' F.S. DEAM., APPROX.
	IBAQUOS K		£ -6	Q	.0' (F.S.) "DEAMETER, APPROX,
			4 %) - 30	0.0' F.S.
(57EPS		Ø			DEAMETER, APPROX.
** envir A	01		ES WITH FLOW CON WERE SAMPL		0' 5.5.
Signature		Date	······································	Of Bottles	
Signature		Date	140.	OI DOMIES	

Tank and Sump Sampling Data Sheet

Date 2-22/23-90
Client EG16 / USATHAMA
Project MMTL WATERTOWN
Case No. CHC3 50

				Case No.	61453 30
TANK / SUMP DES	SCRIPTION				
Sampling Access Descr	intion Ren	nove Stoam	SEWER MANN	roce 1	BAQUOZ /IBAQUOY
Leak Detection / Monit	toring Present (Desc	cribe) Nor	APPLICABLE		1 3
Tank (Sump)Dimension	ons (LxWxH) Sec	BELOW Tot	al Volume	% F	ull FLOW FLOW
Tank Sump Status: A					/
Type Of Construction					
Content History Sz					
HEALTH and SAFI					
Equipment Used (Calil			2.E		
Equipment Oseu (Cam		Time	Reading	Time	Reading
Air Quality Readings	Pre-Sampling			111110	Reading
	During Sampling During Sampling				
	During Sampling During Sampling		 		
	Post-Sampling				
SAMPLING PROC	EDURE				
Equipment Used (Calil	brated Y/N) From	SURFACE, USEN	STAINLESS STEEL	APPEN CHEM	RESIST. GLOVES
Decontamination Proce					•
Detergent V		vent Rinse	Detergent	Wash	Other
Water Rins	se Wa	iter Rinse	Water Rin		
Solvent Rin Water Rins				3x D.	T. HzD RINSE
Solvent Used					
SAMPLING	VOLUME	FILTERED		AMPLYSES	
SAMPLE METHO	OD (ml)	(Y/N)	PRESERV.	OTHER	TIME
1840402 5.5.DEP		No	Ire, HCI pH +2	101+30 You	2250 (2/22/20)
11 11 11	" 1GAUON	No	Ill NaCHPH 12	CYANIDE	1435 (1/21/90) 1435 (1/23/90)
11 11	" 1.0	No	Ice NOOHAN'S	SULFIPE	1435 (2/23/20)
11 11 11	**		ZN PLCTATE		
	" 12	No	Ico, HNO3 pH-2	METHIS/TCI	1435 (2/23/10)
IBAOUOY SAME	Same	SAME	SAME	Same	VOA: 2307 (2/22/10)
LOCATION DIAGE	RAM and NOTE	S (Indicate orie	ntation, sampling k	ocations, dischar	ge / fill points)
8106. # 31	1		1 1840	1402	18AQU04
111111111111111111111111111111111111111	1846402	. = MANHOLES AA		E TRENCH	
134 0	1//26/2	GRATES			11/1/21
	1/2/	= SAMPLE LOC	NTIONS @ OF	400	THOUGH!
IBAOUO4	7 /97 1	240	7		
MW-02	1//	TRENCH, BOTH	ARE ,		
*****		18" DEAM. APP.	,	FLOW B"	
	C C	+ (E) NO FLOW, BO APPHOX 2.5'	TH 6" DEAM. 2.5'		
Signature	174		/ /	Of Rottles	7.7-11
Signature	tor	Date	2/23/40 NO.	Of Bottles	117 = 17

Date 2 - 22/23 - 40	
Client 2-6-16 Jusninama	,
Project AMTE WATERTON	
Case No. 41453-50	

				Case No.	61453-50
TANK / SUMP DESC	RIPTION				
Sampling Access Descript	on REmove	STORM SEL	OER GRATE		
Leak Detection / Monitor	ng Present (Desc	cribe) Nor H	PPLICABLE		
Tank /Sump Dimensions	(LxWxH) SEE	BELOW Tota	al Volume	% Fu	III FLOW
Tank Sump Status: Acti	ve X Ina	ctive			Age
Type Of Construction	BRICK AND CO	PNCAETE			
Content History Srow	M SEWER S	SURFACE RU	IN-OFF		
HEALTH and SAFET	Y MONITOR	ING			
Equipment Used (Calibra	ted Y/N) /o	, APPLECAL	316		
		Time	Reading	Time	Reading
Air Quality Readings	Pre-Sampling During Sampling				_
	During Sampling				
	During Sampling Post-Sampling				
				-	
SAMPLING PROCEI					
Equipment Used (Calibra Decontamination Procedu		SURFACE, USE	NO STATINLESS S	TEEL DIPPER	CLOVES
Detergent Wasi	-	vent Rinse	Detergent	Wash 5	Other
Water Rinse		ter Rinse	Water Rin	K	
Solvent Rinse				3 L D	.I. WATER RENSE
Water Rinse					
Solvent Used ———					
SAMPLING	VOLUME	FILTERED		ANALYSES	
SAMPLE METHOD	(ml)	(Y/N)	PRESERV.	GIHER.	TIME
18 AQUOI S.S. DEPPER	40 mil (13)	No_	Ice HUphes	701+30 Vac	2320 (2/22/40)
<i>jj jj j j j</i>	1.0	No	ILE NADNAN 712	TC1+30 Sems CYANIDE	1902 (2/23/90) 1902 (2/23/90)
11 11 11	1.0	No	ILB, NAONEN: 7	SHIFTDE	1902(2/23/90)
JI 11 I' II	1.0	No	Ict, HHB, and 2	METALS/TCI	1902(2/23/40)
					7702(472)10)
LOCATION DIAGRA	M and NOTE	S (Indicate orie	ntation, sampling lo	cations, dischar	ge / fill points)
	A + 1 = NO				
	TREMCH. BO	OTH 2.5 DEEP T		TRE	NCN
8206.3	9 (A= 30"DEA	m. , 3 = 18" DEAM.			=
15'		1//	@ ()	1 0	<u>D</u>
K- X / IBAQU	01	mw.02	CUR	8	
MD-01 FF	_ /////////	7/ //8/2	7////	/////	////
N. BEACON	STREET	~~~~~	/////	//////	///
	//				
Signature Joy	ent	Date _	2/23/90 No.	Of Bottles	7

Date:

February 9, 1990

To:

C. Washburn

From:

R. Lambe

Loc:

15F/214

Ext:

5498

Subject: AMTL Watertown Samples

I have been informed by my field crew that zinc acetate was added to the water samples for MW-01, MW-02, and MW-10 (collected on February 8) to be analyzed for metals by mistake. Please destroy these samples (metals fraction only). I am having new samples collected for metals today, February 9, for MW-01, MW-02, and MW-10. If you have any further questions, please call me at Ext. 5498.

Date: March 2, 1990

To: C. Washburn S. Spellenberg cc:

K. Thrun From: Loc: 15F/202 Ext: 2311

Subject: EG&G Idaho, AMTL Watertown

As discussed with you and Steve Spellenberg, metals analysis was inadvertently omitted from the chain-of-custody sheets for the following samples:

> 030IL01 03SLG01 03OIL02

050IL01 (if labeled 050IL02, this sample should correctly be

labeled 05OIL01)

Please add.

Date:

February 16, 1990

To:

C. Washburn

From:

R. Lambe

Loc:

15F/214

Ext:

5498

Subject: AMTL Watertown Samples

I have been informed by my field crew that equipment blanks were collected today for the soil sampling activity, four days after the last complete day of soil sampling. The field crew duplicated soil sampling procedures at sample locations 01sol01 and 06sub01 and conducted normal decontamination procedures of all sampling equipment after each sample. Equipment blanks were collected following decontamination procedures and labelled 01sol01BL and 06sub01BL. No soil samples were actually collected during this procedure. If you have any further questions, please call me at extension 5498.

Date:

April 25, 1990

To:

Files

From:

Robert Lambe, AMTL Project Manager

Subject: Chain-of-Custody Forms for AMTL Project

It has come to my attention that three chain-of-custody forms completed by Scot Foster of Arthur D. Little were signed in the "Sampler(s) (Signature)" space and not in the "Relinquished by: (Signature)" space as required. These forms are:

2/9/90

02S0L01, 06AQU01, 17S0L01, 17SUB01, 17SUB02

(two pages)

2/12/90

03S0L01, 06S0L01, 09S0L01, 09S0L02, 13S0L01,

15S0L01, 17S0l02, 17SUB03

(two pages)

2/16/90

OSOLOTTB, OSOLOTBL, O6SUBOTBL

(one page)

Each of the sample containers (coolers) holding these samples was personally delivered by Scot Foster on the evening of the collection day to the limited access, secure facilities of Arthur D. Little at Acorn Park in Cambridge. The samples were logged in by the laboratory as follows:

Samples Taken/Delivered

Samples Received by Laboratory

2/9/90

2/12/90

2/12/90

2/13/90

2/16/90

2/16/90

I, Scott Foster, do attest that the above statement is an accurate description of the situation described.

Witnessed Robert N. Lambe,

Project Manager

NOTARY PUBLIC

COMMONWEALTH OF MASSACHUSETTS

OF HIDDLESEX

NIRGER CONTROLLER NA SERVEY
Region I Wavie Management Division

CHAIN OF CUSTODY RECORD

	ſ						5 = 5	10100	HAIN OF COSTODY RECORD					
PROJ. NO.	<u>.</u>	PROJECT NAME	NAM	<u>ب</u>						13. V.V.	-			
61453		AM74		- WATERTOWN, MA	erown	1, MA.	ž	NO.	\ \ \ \	TO S	\	1		
SAMPLERS: (Signature)	Signal	- furt	1	H			0		353C		133		SEC A. LA-10E BEMABKS	35
STA. NO. D	DATE	TIME	COMP.	ВАЯЭ	STAT	STATION LOCATION	TAIN	TAINERS	CANTON OS. 102 1031	103. THE	SCALAN		500	- pues
MW-02 2/8/10 4:35.10	18/10	4:35.m	-	Jun	-02		3				1-1	1 TACHS: 284	4D1 TALKS: 2846, 2847, 2879 10.	ECE PHAZIKI
			1			(00)					1	0888		100
=	5	=	,	:	:)			×	,	"	0582 : "	SUB NA	CI ~ HO HO
=	=	=	•	=	=				×	5	•	1382:"	Zukane.	P < HO W
=	=	-	7	:-	:		_			×	:	2882		4.2
0/2 10-VM	06/8	2/8/90 6:00,00	7	1 mw-0,	10-		2	×			=	: 2819	2819 2820 F. C. M. 162	61 400
		(7	1	(50)		1		N		1000 X		A. 10
=	=	=	,	=	=		>-		×		:	COAC		1011 110
=	=	=	7	;	=		. `		×	+		7000 11		ICE NOOH PHAR
=	:	:	7	;	=		-			×	: :	•	Ch History	TEE NAUHONST
m 1.10 2/8	2/8/90	7:00-		mi	1		7	^^	>		=	1700		Jet HAUY OH CA
			1		10	CON	1	4/			= (:	1 1	2826, 2827 54	6100-2
) -	-	=	7	:	1.	}	-) >×		=	7, 3000)	200
' ''	11	11	1	::	=		_		X		=		T. Access	Lee Nathamia
, ,	-		7	' ',	11		_			×	7	11:203)	9 (10) 50 10 10	Tec UND W.C.
Relinquished by: (Signature)	by: (S	ignature)		Dat	Date / Time	Received by: (Signature)	nature)	Reli	Relinquished by: (Signature)	ignature		Date / Time	Received by: (Signature)	
and the second second														
Relinquished by: <i>(Signature)</i>	by: (S	'gnature)	:	2/2/96	pate / Time 9δ 12συ	Received by: (Signatura)	Sill OH		Relinquished by: <i>(Signature)</i>	ignatura)		Date / Time	Received by: (Signature)	
Relinquished by: (Signatura	DY: (S.	Somme!	1	Date Date 2/9/90	Date / Time	Received for Lat	oratory by:	(Date / Time		Remarks			
	2	Distribut	tion:	Original Acc	ompanies S	ipmedi. Copy t	ordinator Field	_	7 7 7 7 7	7				

ENVIRONME IL PROTECTION AGENCY

Region I W.L. Management Division

CHAIN OF CUSTODY RECORD

yee for whose new LCC Distance CCG CCC NOTE: METALS SAMPLES Received by: (Signature) Received by: (Signature) Section. REMARKS ADL TAG "5 2920 3168 2919 Date / Time Date / Time Remarks - 1981 C Relinquished by: (Signature) Relinquished by: (Signature) AND P. Date /Time X 34/90 X 3 CON-Š. OF. Received for Laboratory by: Received by: (Signature) Received by: (Signature) STATION LOCATION - NATERTOUN MA TREP BIANK 8:25pm 3/2/63 1500 Date / Time Date / Time Date / Time 06/0/2 SARD PROJECT NAME JJW18 COMP 2/8/90 7:00,4 Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) TIME Ξ Ξ SAMPLERS: (Signature DATE ξ -PROJ. NO. 61453 STA, NO. TREP =

ENVIRONME L PROTECTION AGENCY Region I Waste Management Division

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61453 HMTL -	I I	AMTL - WATERTOWN, MA.	WATER ON	
SAMPLERS: (Signature)	N	T T		See Richard
			\	REMARKS
STA. NO. DATE TIME S	8ARD	STATION LOCATION	18 10, 30	NOTC, METALS SAMPLES
MN-01 2/0/20 6:00pm.	1	10-CM	1 12	1000
MN-022/0/90 4:35p.m.	1	MW-02		000
	1	MW -10		1010
				0707
Relinquished by: <i>(Signature)</i>		Date / Time Received by: (Signature)	Relinquished by: (Signatura) Date	Date / Time Received by: (Signature)
Relinquished by: (Signature)	-	Date / Time Received by: (Signature)	Relinquished by: (Signature)	Date / Time Received by: (Signature)
	0	2/4/90 1200 Will Sill at	J.	
Relinquished by: (Signature)		/ Time Received for Lab		
toy . Juli	B	26/90 Bizion () The color	9/6/90 1145	-
	6			

Cooler Numbe. 1 of 2

Arthur D. Ile, Inc.

CHAIN OF CUS. ODY RECORD

PROJ. NO. PROJECT NAME			
711118 8317	1 - WATERTOWN, MA.		MPLE
SAMPLERS: (Signatura)	1. The	o Sidings	DITION
SAMPLE/ STATION DATE TIME NUMBER	C G STATION M A LOCATION		ЕРТ
CO-3 2-14-90 2:44	1 60-3	, , , , , , , , , , , , , , , , , , ,	7
MW - 06 2.14.8 2154	90		
TREP BLOWK 2-14-90 5:50	AMK	, 0864 V 1869	0 0.1
Relinquished by: (Signature)	Data /Timo		
	Date Trime Treceived by: (Signature)	(Signature) Shipped to:	
Relinquished by: (Signature)	Date/Time Received by: (Sinnature)	Sanature	
		L. M. Hurbucht 2/15/10	
Relinquished by: (Signature)	1	Received for Laboratory by: Date/Time Carrier:	
tof I fat	1 00:4 06/11/5	Well 2/15/40/610	

Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager: Honk Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix
W - Water S - Soil LW - Liquid Waste SW - Solid Waste

0 Cooler Numbe.

Arthur D. Tile, Inc.

CHAIN OF CUSTODY RECORD

Jo -Page__

PROJ. NO.	PROJECT NAME	_			Analyses			/ Remarks	
61453	AMIL	- WATERTOWN, MA.	own M.			100			SAMPLE
SAMPLERS: (Signature)		111	- Company of the Comp		400	100.			CONDITION
	funt	J. Jan .			0.00	100/20/20	\ \ \		UPON
SAMPLE/ STATION NUMBER	DATE TIME	• DE A B B C • DO C • D	STATION	PRESERVATION	15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SOUTH TO THE STATE OF THE STATE			RECEIPT
20-3 2.	4+: C 06:41-2	/ 60.3		Ice, HCloH.2	33		ADL TAGE	ADL TAGE "S' : OBUT ORUR DOUG	77
	=	;	-	Lee, NO HAHIT	>		1	" 085/	-
"		:		Ice, NAONONY	>_		=	"0852	
" "	-	:	"	Ice MNO. PN.2		>	1	'' 0853	
MW-06 2.1	7.5. x 06.41.5	J ML	-06	Ict Helphia	3%			"0854 0855 0AST	
-	2 .	7	*	Lee MOHOHAIZ	\ \ \ \		"	' DRCB	
2	H 11	; /		ICE NADHONY	5_		11	., 0859	
n 4		7	,	Ict HAD. OHAZ		\ <u>\</u>	-	1, 0860	
1	1	1	1		100				
TREE BLANK 2-	2-14-40 3:50	Tare Brown		Ice	350			1	
	11 (1	\ \ \			×	×	" "	See Coed Coed	
									>
Relinquished by: (Signature)	iture)	Date/Time		Received by: (Signature)	Shipp	Shipped to:			
Relinquished by Signature	furo	T V cto		1					
remanded by tolding	(20)	Cate		Received by: (signature) R. M. Mulanitte 2 (1)	2/15/90				***************************************
Relinquished by: (Signature)	ture	Date/Time		Received for Laboratory by: (Signature)		Date / Time	Carrier:		
Inf.	W.	soit astrife	,			21/2 Po 1015			
istribution: Original Acco	Shipmont	F. Vellow Convito Case	Manage Collection	W. Co. Eight Files	7				

w copy to case Manager Tijk Copy for Field Files

(617) 864-5770 Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140
Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur Tittle, Inc.

jo

Cooler Numb.

CHAIN OF CUSTODY RECORD

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PROJ. NO.	PROJ	PROJECT NAME					Analyses		
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SAMPLE/ STATION NUMBER	DATE	TIME	+U0≥0.	*0#<8	STATION	PRESERVATION	Cariana Correction		RECEIPT
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Distribution: Original Accompanies Shipment: Yellow Copy to Case Manager; Pink\Copy for Field Files

(617) 864-5770 **Arthur D. Little, Inc.** 25 Acorn Park, Cambridge, MA 02140 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix
W - Water S - Soil LW - Liquid Waste

Arthur ittle, Inc.

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Cooler Numb

CHAIN OF CUS FODY RECORD

PROJ. NO.	PROJECT NAME	113			Analyses / / / / / / Bemarks	
61453	- 71WH	3	ATERTOWN, MA.			SAMPLE
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Distribution: Original Accompanies Shipment: Yellow Copy to Case Manager; Pirk Copy for Field Files

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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Cooler Numb.

Arthur , ittle, Inc.

CHAIN OF CUS FODY RECORD

PROJ. NO. PROJECT NAME		
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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur Ttle, Inc.

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CHAIN OF CUSTODY RECORD

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CONDITION SAMPLE RECEIPT UPON 1.610 AN 1116. \$: 0788,0789,0790 96£0 10792 8650 HLEO: 5660 1620 :0793 , 0800 1860 1080 Carrier: Lasting of Shipped to: \overline{z} 3 3 PRESERVATION Received by: (Signature) Received by: (Signature) AMTL - WATERTOWN, MM. STATION 2/13/50 | 1330 | 04:3 C1- CIWI 50.3 Date / Time = : 7 * @E< ۵٥٥ PROJECT NAME o iec TIME 12-12-96 5:05 7 = = • = = = 1 2-12.90 DATE Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) = ₹ = 7 2 = SAMPLERS: (Signature) = = PROJ. NO. 81453 SAMPLE/ STATION NUMBER MN-12 z, = = 3 > : : 7 S : :

Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pinki Gopy for Field Files

(617) 864-5770 **Arthur D. Little, Inc.** 25 Acorn Park, Cambridge, MA 02140 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur f ttle, Inc.

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CHAIN OF CUSTODY RECORD

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PROJ. NO.	PROJI	PROJECT NAME AMIL -	1	DATESTOUM, MA.	MA.	33.8.7.6.7.	SAMPLE
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Distribution: Original Accompanies Shipment, Yellow Copy to Case Manager, Pink Copy for Field Files

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

of Jo Cooler Number

Arthur C le, Inc.

CHAIN OF CUS YODY RECORD

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pink Copy for	Accompanie	s Shipmen	ıt; Yellov	w Copy	to Case Manage	ier; Pink, Copy for Field Files		

(617) 864-5770
 Arthur D. Little, Inc.
 25 Acorn Park, Cambridge, MA 02140

 Telex 921436
 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur Tittle, Inc.

Cooler Number:

CHAIN OF CUSTODY RECORD

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CONDITION Cyanide Cumminas Campine sse SAMPLE RECEIPT UPON 1 2925 2926, 2927 SC 6 E ' E 16 E CE 6 E 6.5 6.0 Remarks 2757 2930 4929 12024 11: 2923 11: 2931 3453 5.562 ! " 12921 1 : 295A 1: Kist 1. 2922 3115 , v 126 700 Carrier: 57×1370 732 -Date/Time Shipped to: 67 7~ Jec. 11.016 1142 [CE NA 011 pH712 Ici HNO, allex 116 1100 July Tre NAMI CHT Ece, 115101122 PRESERVATION Ninoth, Entice rule 11,13 H, TCC ree, 110101167 Received for Laboratory by: (Signature) MW 3. 760 Received by: (Signature, Received by: (Signature Rec 1001 tice 4 2 STATION 1920-07 -07 0501 08/21/6 1715-13 14 W.M 81- CiVI mw-13 11111-14 0- C14W 41 min MW-14 1110-13 180 5:30 MW-14 0- mul 11-11 Date / Time Date/Time Date / Time MMTL - WATERTOWW, 1274. 7 * (D(K < (1) 7 7 *00**≥**0 PROJECT NAME TIME 02: X cr 1" ce 11:20 200 _ 1 ź 1 -2.9.90 2.9.20 2.9-90 2-9-90 -9-70 26 6 1-9 30 2.6.6 C6. B0-86 13-21-61 69-16-60 3-6-6 DATE 20.00 Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) SAMPLERS: (Signature) PROJ. NO SAMPLE/ STATION NUMBER MW-13 MW-14 MW - 14 10- MM M11 - OP MW-14 81- MW #1 - MW MW-14 11-11 8.5419 M1.13 12 - Cl

Distribution: Original Accompanies Shipment: Yellow Copy to Case Manager; Pint/Copy to Field Files

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*Letter denotes sample matrix W - Water S - Soil LW

S - Soil LW - Liquid Waste

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Cooler Number.

CHAIN OF CLSTODY RECORD

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Puk Copy for Field Files

(617) 864-5770 25 Acorn Park, Cambridge, MA 02140 Telex 921436 Tel-Fax (617) 661-1622 Arthur D. Little, Inc.

*Letter denotes sample matrix
W - Water S - Soil LW - Liquid Waste

Cooler Numb. 1 of 4

Arthur [ittle, Inc.

CHAIN OF CUS FODY RECORD

Page ____ of ___

OONDITION UPON HECEIPT O934 O934 Carrier:	Analyses
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stribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 Telex 921436 Tel-Fax (617) 661-1622

(617) 864-5770

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

quid Waste SW - Solid Waste

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Arthur ' ittle, Inc.

CHAIN OF CUSTODY RECORD

	SAMPLE	CONDITION	UPON	RECEIPT																
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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Cooler Number:

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CHAIN OF CUSTODY RECORD

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Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

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ittle, Inc. Arthur

CHAIN OF CUSTODY RECORD

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PROJ. NO.	PROJE	PROJECT NAME	111				Analyses / / / / / / / /	Remarks	
61453	B	AM71 -	1	121	Areasown MA	,	\		SAMPLE
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istribution: Original Ac	scompanie	s Shipmer	nt, Yell	low Co	sistribution: Original Accompanies Shipment, Yellow Copy to Case Manager, Pink Copy for	opy for Field Files			

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 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Cooler Num. 3

.ittle, Inc. Arthur

CHAIN OF CUSTODY RECORD

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

ENVIRONME 1L PROTECTION AGENCY

Region I Wase Management Division

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ENVIRONME TO PROTECTION AGENCY Region I Waste Management Division

		CHAIN OF COSTODY RECORD	
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Arthur r title, Inc.

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Cooler Number: __

CHAIN OF CUSTODY RECORD

Page _ of 2

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Distribution: Original Accompanies Shipment; Yellow Copy to Case Manager; Pink Copy for Field Files

Arthur D. Little, Inc. 25 Acorn Park, Cambridge, MA 02140 (617) 864-5770 Telex 921436 Tel-Fax (617) 661-1622

*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Waste SW - Solid Waste

ENVIRONMEN® PROTECTION AGENCY
Region I Wass Management Division

CHAIN OF CUSTODY RECORD

PROJ. NO. PRO.	PROJECT NAME	ME			
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Cooler Number:

CHAIN OF CUSTODY RECORD

Page of 1

CONDITION SAMPLE RECEIPT UPON EXPECT High METAL CONTEXNT MCL. Fo, Co, Nº - SAMPLE SCREENING RESTOR ONE SAMPLE FOR BOTH PCB'S - STAT Carrier: 2/12/93/1030 Date/Time Shipped to: 3 MA ON ACETATE HNO3, 1CE **PRESERVATION** NAOH, ICE Received for Laboratory by: アクト ICE HOL Received by: (Signature) 9 : ç - WATERFOON, MA Buty 100 -UNIDERTR. TANK V PACK SUTHOFF STATION LOCATION 1115,126 BL(49 311 102/12/50 1030 Date / Time 7, 1 * @E<E > > • ∪⊙≥۵ AM トク PROJECT NAME 9:42 2/1/90 10:45 29/1/20 3:45 TIME 1 , 7 ; ; ; 2/9/2 DATE ز 1 Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) ز = 4 SAMPLERS: (Signature) 61453 10-75-20 PROJ. NO. 06 AQU 01 SAMPLE/ STATION NUMBER 125601 1 7 5 7 1

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

ENVIRONMENT PROTECTION AGENCY Region I Was, Aanagement Division

CHAIN OF CUSTODY RECORD

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Distribution: Original Accompanies Shipmeht; Copy to Coordinator Field Files

Arthur D tle, Inc.

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Distribution: Original Accompanies Shipmon	Spaincomo	hinmen	-1≥	000		NANA A		-

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Arthur Little, Inc. CHAIN OF CUSTODY RECORD

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Cooler Num

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PROJ. NO. PROJECT NAME	IE	Analyses / M M	Remarks	
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Arthur D

Cooler Number.

CHAIN OF CUSTODY RECORD

tle, Inc.

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CONDITION SAMPLE RECEIPT UPON AD1 TACK : 0887 0888 0889 ADL TAC# :0899, 0900,0901 1 VOA OIAGUAI is missing Remarks ADL TAG#: 0866, 0867 2060: 6980 : 0870 0880 : 0872 : 0892 1680 : 1680: × Date / Time X Shipped to: * 131 mg (\$2.73) $^{\lambda}$ × × 3 30 Ice, do OH, oHY12 Extresions Ice, do OH oHY 9 Ice, HHO, pHez 5c6, HC/0H-2 **PRESERVATION** Received by: (Signature) 12/21/50 | 925 | Will Sill Ice Ice 106 Ice Ice Leet Sump, EAST SLDE 6. 550 € Bupl. 39 SELLER CLEANOUR AMIL - WARREN MA. STATION LOCATION oute sale GAST TANK 2/20/90 1550 Date/Time BIDG. : • OE < B •00**≥**1 PROJECT NAME 1330 TIME 1530 1530 = = • : = = Ξ 2/20/2 2/20/20 2/20/10 Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) Ξ t = = = SAMPLERS: (Signature) = 0521602 PROJ. NO. = 01 AQU 01 = SAMPLE/ STATION NUMBER 6305102 61453 = =

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Was

LW - Liquid Waste SW - Solid Waste

2 Cooler Number

Arthur [ttle, Inc.

CHAIN OF CUSTODY RECORD

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PROJ. NO. PR	PROJECT NAME					Analyses		Company / / / /	
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istribution: Original Accompa	anies Shipment.	: Yellow Ca	opy to Case Manag	ger; Pink Co	py for Field Files				

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*Letter denotes sample matrix W - Water S - Soil LW - Liquid Waste

Arthur D tle, Inc.

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Cooler Number.

CHAIN OF CUSTODY RECORD

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CONDITION SAMPLE RECEIPT UPON 035LGOI bottles says VOAs, not semi vuts アカセ COLLECTED SED 0918 SAMPLES. 1 containers 2160 \$160 0160: # 241 10A ADL TAG# : 0913, 0914 ADL TAG# : 0916 0921 6/60 : : 0920 5/60: 7 3 2/22/50 1640 X /X $_{7}$ X λ X × × × × **PRESERVATION** Received for Laboratory by: (Signature) Received by: (Signature) Received by: (Signature) Ice Ice Ice WATERTOWN, MA FLOOR BLDG 226 ICE 106 Sume BLOG, 36 Ice STATION 228 メスタム 0/19/06/22/2 2-22-90 1530 Date/Time BLDG = • QE < B AM72 PROJECT NAME 12-22-90 1335 2-22-90 1445 2-22-90 1445 07#QUOI 2-22-50 1445 2-22-90 1445 2-22-90 1355 TIME 2-22-90 1335 2-22-90 1355 DATE Relinquished by: (Signature) Relinquished by: (Signature) Relinquished by: (Signature) SAMPLERS: (Signature 0356601 0305101 10 nd# £0 PROJ. NO. 61453 0305101 1000xto SAMPLE/ STATION NUMBER 1997589 10 may to

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LW - Liquid Waste *Letter denotes sample matrix S - Soil